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TREVALI MINING CORPORATION

TECHNICAL REPORT ON THE ROSH PINAH MINE, NAMIBIA

NI 43-101 Report

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April 7, 2017
Effective December 31, 2016

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Report Control Form

Document Title	Technical Report on the Rosh Pinah Mine, Namibia		
Client Name & Address	Dr. Mark Cruise, President and CEO Trevali Mining Corporation 2300 - 1177 West Hastings Street Vancouver, British Columbia Canada, V6E 2K3		
Document Reference	Project #2765	***Status & Issue No.***	FINAL Version
Issue Date	April 7, 2017		
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1 SUMMARY

EXECUTIVE SUMMARY

Roscoe Postle Associates Inc. (RPA) was retained by Trevali Mining Corporation (Trevali) to prepare an independent Technical Report on the Rosh Pinah underground zinc-lead mine, located in Namibia which is operated by Rosh Pinah Zinc Corporation (Proprietary) Limited (RPZC). Glencore International PLC (Glencore) holds an 80.08% interest in the Rosh Pinah mine and 19.92% is held by Namibian Broad-Based Empowerment Groupings and an Employee Empowerment Participation Scheme (EEPS). The purpose of this report is to document the Mineral Resource and Mineral Reserve estimates, prepared by RPZC and audited by RPA as of December 31, 2016. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. RPA visited the property from January 25 to 27, 2017.

Trevali is a zinc-focused, base metals mining company with two commercially producing operations. Trevali is actively producing zinc and lead-silver concentrates from its 2,000 tonne per day (tpd) Santander mine in Peru and its 3,000 tpd Caribou mine in the Bathurst Mining Camp of northern New Brunswick, Canada.

On March 13, 2017, Trevali announced that it had entered into definitive agreements with Glencore International PLC (Glencore) and certain of its subsidiaries whereby Trevali would acquire a portfolio of zinc assets from Glencore, including an 80.08% interest in the Rosh Pinah mine located in Namibia.

Rosh Pinah is a 1,880 tpd underground mine, producing zinc and lead concentrates, with copper, silver, and gold as by-products. The sulphides are concentrated in a flotation plant using separate zinc and lead circuits. The zinc and lead concentrates are transported by road to Luderitz, a port on the Namibian coast, and then shipped to the international smelters and refineries. The Rosh Pinah mine is 80.08% owned by Glencore

Rosh Pinah Mineral Resources, estimated as at December 31, 2016 and audited by RPA, are summarized in Table 1-1.

TABLE 1-1 MINERAL RESOURCE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

		Grade			Contained Metal (Tonnes)	
Classification	**Tonnes (M)**	**Zn (%)**	**Pb (%)**	**Ag (g/t)**	**Zn**	**Pb**
Measured	3.35	8.74	1.65	27.02	293,000	55,300
Indicated	6.59	7.40	1.44	22.77	487,500	94,900
Measured and Indicated	**9.94**	**7.85**	**1.51**	**24.20**	**780,500**	**150,200**
Inferred	2.93	5.96	1.06	30.04	174,600	31,000

Notes:
1. CIM definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 4% Zn Equivalent.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

Rosh Pinah Mineral Reserves, estimated as at December 31, 2016 and audited by RPA, are summarized in Table 1-2.

TABLE 1-2 MINERAL RESERVE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

		Grade			Contained Metal (Tonnes)	
Classification	**Tonnes (M)**	**Zn (%)**	**Pb (%)**	**Ag (g/t)**	**Zn**	**Pb**
Proven	1.61	9.88	1.01	17.19	159,100	16,300
Probable	3.47	8.29	1.65	22.32	287,700	57,200
Proven and Probable	**5.08**	**8.78**	**1.45**	**20.75**	**446,700**	**73,500**

Notes:
1. CIM definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at various Net Smelter Return (NSR) cut-off values depending on required development.
3. Mineral Reserves are estimated using average consensus forecast long-term prices of US$1.03/lb Zn, US$0.93/lb Pb, US$18.65/oz Ag and US$1,358/oz Au at an exchange rate of 17.71 NAD/US$.
4. Shown at 100% ownership.
5. Numbers may not add due to rounding.

RPA is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource or Mineral Reserve estimates.

CONCLUSIONS

Based on RPA's site visit, discussion with Rosh Pinah personnel, and review of the available documentation, RPA offers the following interpretation and conclusions.

GEOLOGY AND MINERAL RESOURCES

- The geology and mineralization is well understood by Rosh Pinah geology personnel.
- Drilling, sampling, quality assurance/quality control (QA/QC), and sample preparation and analyses were appropriate for the style of mineralization and adequate for Mineral Resource estimation.
- The assumptions, parameters, and methodology are appropriate for the style of mineralization.
- Mineral Resources were estimated consistent with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions).
- Measured plus Indicated Mineral Resources total 9.94 Mt grading 7.85% Zn, 1.51% Pb, and 24.20 g/t Ag.
- Inferred Mineral Resources total 2.93 Mt grading 5.96% Zn, 1.06% Pb, and 30.04 g/t Ag.
- The extent of the orebody and mine has been generally defined by exploration drilling, however, the potential below and lateral to current orebodies is considered high and is being investigated.

MINING AND MINERAL RESERVES

- The Mineral Reserve estimate has been prepared utilizing acceptable estimation methodologies and the classification of Proven and Probable Mineral Reserves conform to CIM definitions and NI 43-101.
- The Mineral Reserve estimate was prepared using Mineable Stope Optimizer (MSO) to determine an array of potential minable stope shapes per level based on a selection of cut-off grades as determined using a Basic Mining Equation (BME) which captures the full cost of the mining operation including mining, processing, shipping, and smelting costs.
- The NSR cut-off values used for Mineral Reserve estimation are acceptable.
- The Proven and Probable Mineral Reserve totals 5.08 Mt at 8.78% Zn, 1.45% Pb, and 20.75 g/t Ag containing 446,700 t of zinc and 73,500 t of lead.
- The Mineral Reserve estimate takes into consideration metallurgical recoveries, concentrate grades, transportation costs, smelter treatment charges, and royalty in determining economic viability.

MINERAL PROCESSING

- The process plant includes crushing, screening, and grinding followed by lead/zinc flotation and filtering to produce separate lead and zinc concentrates.

- Variations in the WF3 orebody (higher iron and harder ore) have necessitated the installation of regrind circuits (the regrind project) in both the lead and zinc circuits as well as additional cleaning capacity in the lead circuit to optimize beneficiation.

- The installation of the regrind project is to ensure that the plant achieves saleable concentrate grade at all times as well as significantly reducing iron and mercury penalties in the zinc concentrate. It is currently anticipated that the project will be completed in late 2017.

- The life of mine (LOM) process plant production schedule includes benefits from the regrind project from 2018 onwards including:
  - Lead recovery increase of 2.5%
  - Lead concentrate grade increase of 0.5%
  - Zinc recovery increase of 0.9%
  - Zinc concentrate grade increase of 1.6%
  - Reduced zinc impurities penalty of $5.00/t of zinc concentrate

ENVIRONMENTAL, SOCIAL, COMMUNITY

- Based on the site visit conducted on January 25 to 27, 2017 at RPZC, the review of available reports and documents as well as discussions held with management, no evidence of environmental issues that could materially impact the ability to extract the mineral resources or mineral reserves at RPZC were observed. There are, however, environmental and social risks that need to be mitigated and managed.

ECONOMIC ANALYSIS

- The pre-tax Net Present Value (NPV) at a 10% discount rate is $229 million after accounting for all operating costs, capital expenditures, and royalties.

- The LOM NPV at a 10% discount rate is most sensitive to the product of changes in the head grade and zinc price followed by changes in the recovery, capital costs, and operating costs.

RECOMMENDATIONS

RPA offers the following recommendations.

GEOLOGY AND MINERAL RESOURCES

- Since the internal Rosh Pinah mine Laboratory is not internationally certified, RPA recommends that a consistent review of external check assaying for geology samples be implemented.

- A reconciliation of the resource model versus the actual tonnage and grade, as determined by the process facility, should be a standard practice for the annual Mineral Resource estimation.

- A standard Mineral Resource reporting template should be updated each year for all reported Mineral Resources.

MINING AND MINERAL RESERVES

- Continue to install cable anchor ground support in areas with stability issues in the WF3 orebody.

- Carry out improvements in the underground water handling system.

MINERAL PROCESSING

- Implement the regrind project to maintain historical throughput levels and recoveries.

ENVIRONMENTAL, SOCIAL, COMMUNITY

- The following environmental and social risks should be mitigated and managed:
  - The PM10 dust fallout levels at the mine at village of Rosh Pinah.
  - Continue monitoring lead in blood levels and take appropriate control measures to keep lead levels below regulatory parameters (especially in areas that are affected by the tailing facility and in the storage area in Lüderitz).
  - Surface and ground water quality samples should be handled and analyzed in line with Laboratory Testing Standards to ensure data is adequate to understand potential pollution plumes developing around the operational facilities at the mine. Check samples at outside laboratories should be sent to help verify lab results on site.
  - Acid rock drainage potential should be evaluated and managed.
  - Social expectations of employees and residents of the town of Rosh Pinah, should mining operations cease at the Skorpion Zinc mine, which is located in the same municipality.
  - RoshSkor, a joint-venture private company established to manage and operate the town of Rosh Pinah as a private municipality, will need to be managed in closing out of the audit findings regarding waste management.
  - Plans to be developed around water and power security.

ECONOMIC ANALYSIS

A Cash Flow Projection has been generated from the LOM production schedule and capital and operating cost estimates, and is summarized in Table 1-3. The associated process recoveries, metal prices, operating costs, refining and transportation charges, royalties, and capital expenditures (sustaining) were also taken into account. All costs are based on fourth quarter of 2016 estimates and presented in US dollars. Metal prices, as provided by Trevali, are based on consensus, long term forecasts from banks, financial institutions, and other sources. Some of the key parameters and assumptions for the pre-tax cash flow are as follows:

Revenue (100% Basis)

- 1,820 tpd
- LOM head grade: 8.78% Zn, 1.45% Pb, 20.75 g/t Ag
- Mill recovery averaging: 89.4%
- Metal prices based on consensus forecasts by year, averaging: $1.10/lb zinc, $0.93/lb lead, $19.35/oz silver
- Smelting and transport costs totalling $0.21 per pound payable zinc (net of by-product credits).
- NSR: $128 per tonne milled.

Costs (100% Basis)

- Mine life: 8.0 years
- Sustaining capital: $88.2 million
- Average operating cost over the mine life: $44.26/t milled
- Closure costs: $3.8 million
- Salvage costs: nil
- NSR Royalty: $40.9 million
- Net cash cost (equivalent to C1 cost), including capital, of $0.63 per pound of payable zinc (net of by-product credits).
- The pre-tax NPV at a 10% discount rate is $229 million.

TABLE 1-3 CASH FLOW SUMMARY - 100% BASIS
Trevali Mining Corporation - Rosh Pinah Mine

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
MINING											
Operating Days		days	2,733	365	365	365	365	365	365	365	178
Tonnes milled per day		tonnes / day	1,820	1,818	1,786	1,767	1,809	1,850	1,850	1,851	1,846
Production		'000 tonnes	5,007	637	655	666	672	670	669	710	329
Au Grade		g/t	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Ag Grade		g/t	20.75	22.87	28.21	14.21	14.85	13.74	30.93	26.87	7.43
Pb Grade		%	1.45%	1.17%	1.99%	1.39%	0.93%	1.25%	2.34%	1.26%	1.05%
Zn Grade		%	8.78%	9.77%	8.75%	8.01%	9.83%	9.03%	8.37%	8.40%	7.42%
PROCESSING											
Mill Feed		'000 tonnes	5,007	637	655	666	672	670	669	710	329
Au Grade		g/t	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Ag Grade		g/t	20.75	22.87	28.21	14.21	14.85	13.74	30.93	26.87	7.43
Pb Grade		%	1.45%	1.17%	1.99%	1.39%	0.93%	1.25%	2.34%	1.26%	1.05%
Zn Grade		%	8.78%	9.77%	8.75%	8.01%	9.83%	9.03%	8.37%	8.40%	7.42%
Contained Au		oz	48,296	6,141	6,316	6,427	6,484	6,460	6,452	6,846	3,170
Contained Ag		oz	3,340,473	468,205	593,918	304,375	320,998	295,964	665,314	613,179	78,520
Contained Pb		tonnes	72,371	7,452	13,047	9,259	6,238	8,351	15,658	8,915	3,451
Contained Zn		tonnes	439,419	62,223	57,278	53,382	66,072	60,488	55,965	59,624	24,389
Recovery Grade											
Pb Concentrate	Recovery #1	%									
Au			30%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Ag			40%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Pb			68%	63.9%	75.7%	69.0%	55.4%	65.6%	78.0%	64.8%	71.6%
Zn Concentrate	Recovery #2	%									
Zn			89.4%	89.0%	89.5%	88.6%	90.7%	89.9%	89.1%	89.3%	88.5%
Recovered Amount											
Pb Concentrate	Recovery #1										
Au		oz	14,489	1,842	1,895	1,928	1,945	1,938	1,936	2,054	951
Ag		oz	1,336,189	187,282	237,567	121,750	128,399	118,386	266,126	245,272	31,408
Pb		tonnes	50,419	4,761	9,880	6,387	3,457	5,478	12,210	5,775	2,471
Zn Concentrate	Recovery #2										
Zn		tonnes	392,983	55,394	51,282	47,319	59,944	54,353	49,853	53,259	21,579
Grades in Concentrate											
Pb Concentrate		tonnes	99,220	9,648	18,956	12,614	6,915	11,163	23,532	11,550	4,842
Au grade in concentrate		g/t	4.54	5.9	3.1	4.8	8.8	5.4	2.6	5.5	6.1
Ag grade in concentrate		g/t	418.87	604	390	300	578	330	352	660	202
Pb grade in concentrate		%	50.82%	49.3%	52.1%	50.6%	50.0%	49.1%	51.9%	50.0%	51.0%
Zn grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Concentrate Moisture				6.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Zn Concentrate		tonnes	725,316	105,710	94,101	87,505	108,842	99,450	91,841	97,905	39,961
Zn grade in concentrate		%	54.18%	52.4%	54.5%	54.1%	55.1%	54.7%	54.3%	54.4%	54.0%
Concentrate Moisture				8.0%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%
Total Tonnes Concentrate		wmt	885,864	124,441	121,367	107,495	124,317	118,774	123,835	117,529	48,107
Total Recovered											
Au		**oz**	**14,489**	**1,842**	**1,895**	**1,928**	**1,945**	**1,938**	**1,936**	**2,054**	**951**
Ag		**oz**	**1,336,189**	**187,282**	**237,567**	**121,750**	**128,399**	**118,386**	**266,126**	**245,272**	**31,408**
Pb		**tonnes**	**50,419**	**4,761**	**9,880**	**6,387**	**3,457**	**5,478**	**12,210**	**5,775**	**2,471**
Zn		**tonnes**	**392,983**	**55,394**	**51,282**	**47,319**	**59,944**	**54,353**	**49,853**	**53,259**	**21,579**

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
REVENUE											
Metal Prices		**Input Units**									
Au		US$/oz Au	$1,303.76	$1,283.00	$1,300.00	$1,305.50	$1,313.75	$1,300.00	$1,325.00	$1,300.00	$1,300.00
Ag		US$/oz Ag	$19.35	$18.30	$18.50	$19.00	$20.00	$20.00	$19.25	$20.00	$20.00
Pb		US$/lb Pb	$0.93	$0.93	$0.92	$0.95	$0.94	$0.93	$0.95	$0.92	$0.92
Zn		US$/lb Zn	$1.10	$1.15	$1.19	$1.12	$1.10	$1.10	$1.08	$1.00	$1.00
Concentrate Payable %											
Pb Concentrate Payable %											
Payable Au		%	74.49%	83.2%	67.8%	79.0%	88.6%	81.5%	60.9%	81.9%	83.6%
Payable Ag		%	86.86%	91.7%	87.2%	83.3%	91.3%	84.8%	85.8%	92.4%	75.2%
Payable Pb		%	94.09%	93.9%	94.2%	94.1%	94.0%	93.9%	94.2%	94.0%	94.1%
Zn Concentrate Payable %											
Payable Zn		%	85.0%	84.7%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Concentrate Payable											
Pb Concentrate Payable											
Payable Au		oz	11,299	1,532	1,285	1,523	1,723	1,579	1,179	1,683	795
Payable Ag		oz	1,176,689	171,773	207,094	101,472	117,284	100,441	228,297	226,704	23,624
Payable Pb		tonnes	47,443	4,471	9,311	6,009	3,250	5,144	11,504	5,429	2,326
Zn Concentrate Payable											
Payable Zn		tonnes	333,888	46,937	43,590	40,221	50,952	46,200	42,375	45,271	18,342
			$ 736,089,536								
Gross Revenue											
Au Gross Revenue		US$ '000	$14,724	$1,966	$1,671	$1,988	$2,263	$2,053	$1,562	$2,187	$1,034
Ag Gross Revenue		US$ '000	$22,658	$3,143	$3,831	$1,928	$2,346	$2,009	$4,395	$4,534	$472
Pb Gross Revenue		US$ '000	$97,754	$9,167	$18,937	$12,585	$6,699	$10,546	$24,093	$11,010	$4,717
Zn Gross Revenue		US$ '000	$808,470	$119,251	$113,910	$99,044	$123,563	$112,036	$100,426	$99,803	$40,437
Total Gross Revenue		**US$ '000**	**$943,606**	**$133,527**	**$138,348**	**$115,545**	**$134,871**	**$126,644**	**$130,476**	**$117,535**	**$46,660**
Total Charges											
Transport to Port											
Pb Concentrate		US$ '000	$3,122	$334	$631	$403	$212	$328	$707	$355	$153
Zn Concentrate		US$ '000	$21,804	$3,528	$2,989	$2,663	$3,174	$2,779	$2,622	$2,857	$1,193
Treatment											
Pb Concentrate		US$ '000	$15,586	$1,254	$3,033	$2,018	$1,106	$1,786	$3,765	$1,848	$775
Zn Concentrate		US$ '000	$158,238	$18,552	$20,514	$19,470	$24,462	$22,477	$20,947	$22,533	$9,283
Refining cost											
Au		US$ '000	$169	$23	$19	$23	$26	$24	$18	$25	$12
Ag		US$ '000	$1,765	$258	$311	$152	$176	$151	$342	$340	$35
Zn Impurities		US$ '000	$3,627	$529	$471	$438	$544	$497	$459	$490	$200
Freight Roll Back											
Pb		US$ '000	$7,677	$743	$1,468	$977	$535	$864	$1,822	$894	$375
Zn		US$ '000	$49,395	$7,238	$6,402	$5,954	$7,405	$6,766	$6,249	$6,661	$2,719
Total Charges		US$ '000	$261,384	$32,458	$35,837	$32,096	$37,641	$35,672	$36,931	$36,004	$14,744
Net Smelter Return		**US$ '000**	**$682,222**	**$101,069**	**$102,511**	**$83,449**	**$97,230**	**$90,972**	**$93,545**	**$81,531**	**$31,916**
Royalty NSR	6%	US$ '000	$40,933	$6,064	$6,151	$5,007	$5,834	$5,458	$5,613	$4,892	$1,915
Net Revenue		**US$ '000**	**$641,289**	**$95,005**	**$96,360**	**$78,442**	**$91,396**	**$85,513**	**$87,932**	**$76,639**	**$30,001**
Unit NSR		**US$/t milled**	**$128**	**$149**	**$147**	**$118**	**$136**	**$128**	**$131**	**$108**	**$91**

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
OPERATING COST											
Mining (Underground)		US$/t milled	$18.04	$19.01	$18.48	$18.16	$18.00	$18.07	$18.09	$17.05	$17.05
Processing		US$/t milled	$10.79	$11.37	$11.05	$10.86	$10.77	$10.81	$10.82	$10.20	$10.20
Maintenance		US$/t milled	$8.43	$8.88	$8.64	$8.49	$8.41	$8.44	$8.45	$7.97	$7.97
G&A		US$/t milled	$7.01	$6.62	$6.72	$6.90	$7.29	$7.32	$7.32	$6.90	$6.90
Total Operating Cost		**US$/t milled**	**$44.26**	**$45.88**	**$44.89**	**$44.42**	**$44.47**	**$44.64**	**$44.69**	**$42.12**	**$42.12**
Mining (Underground)		US$ '000	$90,320	$12,102	$12,102	$12,102	$12,102	$12,102	$12,102	$12,102	$5,603
Processing		US$ '000	$54,021	$7,239	$7,239	$7,239	$7,239	$7,239	$7,239	$7,239	$3,351
Maintenance		US$ '000	$42,208	$5,656	$5,656	$5,656	$5,656	$5,656	$5,656	$5,656	$2,619
G&A		US$ '000	$35,081	$4,213	$4,400	$4,600	$4,900	$4,900	$4,900	$4,900	$2,269
Total Operating Cost		**US$ '000**	**$221,630**	**$29,209**	**$29,396**	**$29,596**	**$29,896**	**$29,896**	**$29,896**	**$29,896**	**$13,842**
Operating Cashflow		US$ '000	$419,659	$65,796	$66,964	$48,845	$61,499	$55,617	$58,036	$46,743	$16,159
CAPITAL COST											
Stay in Business Capital											
Engineering & HSEC		US$ '000	$8,205	$1,768	$1,232	$670	$907	$907	$907	$907	$907
Exploration		US$ '000	$3,747	$942	$1,018	$967	$820	$0	$0	$0	$0
Mine development		US$ '000	$23,963	$6,656	$7,142	$7,045	$3,120	$0	$0	$0	$0
Mining equipment		US$ '000	$37,870	$2,952	$5,756	$4,119	$5,009	$5,009	$5,009	$5,009	$5,009
Plant		US$ '000	$709	$215	$80	$200	$41	$43	$43	$43	$43
Services & Maintenance		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Administration, IT		US$ '000	$1,546	$479	$277	$225	$109	$114	$114	$114	$114
Total Direct Cost		**US$ '000**	**$76,040**	**$13,012**	**$15,506**	**$13,225**	**$10,005**	**$6,073**	**$6,073**	**$6,073**	**$6,073**
Business Improvement		US$ '000	$8,379	$7,322	$1,057	$0	$0	$0	$0	$0	$0
Working Capital		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Reclamation and closure		US$ '000	$3,819	$0	$0	$0	$0	$0	$0	$0	$3,819
Total Capital Cost		**US$ '000**	**$88,239**	**$20,334**	**$16,563**	**$13,225**	**$10,005**	**$6,073**	**$6,073**	**$6,073**	**$9,892**
Net Cash Cost Including Capital		US$/Lb payable Zn	$0.63	$0.68	$0.65	$0.70	$0.61	$0.59	$0.53	$0.58	$0.83
PRE-TAX CASH FLOW											
Net Pre-Tax Cashflow		US$ '000	$331,420	$ 45,462	$ 50,400	$ 35,620	$ 51,494	$ 49,544	$ 51,963	$ 40,670	$6,267
Cumulative Pre-Tax Cashflow		US$ '000		$ 45,462	$ 95,862	$ 131,482	$ 182,976	$ 232,520	$ 284,483	$ 325,153	$331,420
Taxes		US$ '000	$95,382	$ 16,683	$ 17,121	$ 10,327	$ 15,072	$ 12,866	$ 13,773	$ 9,539	$0
After-Tax Cashflow		US$ '000	$236,038	$ 28,778	$ 33,279	$ 25,293	$ 36,422	$ 36,678	$ 38,190	$ 31,131	$6,267
Cumulative After-Tax Cashflow		US$ '000		$ 28,778	$ 62,057	$ 87,350	$ 123,772	$ 160,450	$ 198,639	$ 229,771	$236,038
PROJECT ECONOMICS											
Pre-Tax IRR		%	0.0%								
Pre-tax NPV at 5% discounting	5.0%	US$ '000	$272,886								
Pre-tax NPV at 7.5% discounting	7.5%	US$ '000	$249,343								
Pre-tax NPV at 10% discounting	10.0%	US$ '000	$228,803								
After-Tax IRR		%	0.0%								
After-Tax NPV at 5% discounting	5.0%	US$ '000	$193,008								
After-Tax NPV at 7.5% discounting	7.5%	US$ '000	$175,773								
After-tax NPV at 10% discounting	10.0%	US$ '000	$160,775								

SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined through analysis of cash flow sensitivities:

- Head grade
- Zinc recovery
- Zinc price
- Operating costs
- Sustaining capital costs

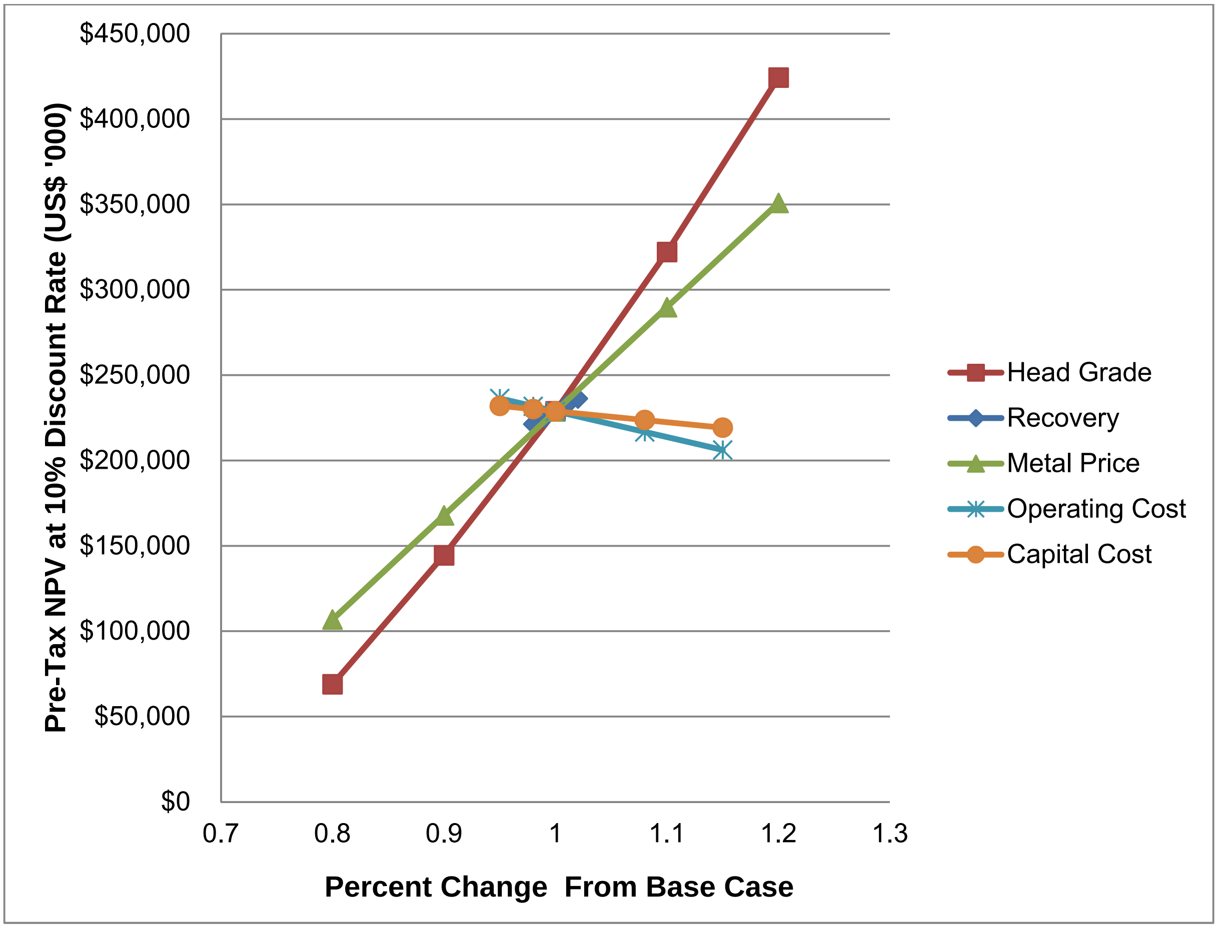
NPV at a 10% discount sensitivities over the Base Case have been calculated per Table 1-4. The sensitivities are shown in Table 1-4 and Figure 1-1. The Project return is most sensitive to changes in the head grade and zinc price followed by changes in the recovery, capital costs, and operating costs.

TABLE 1-4 SENSITIVITY ANALYSIS
Trevali Mining Corporation – Rosh Pinah Mine

	Head Grade (% Zn)	NPV at 10% ($M)
0.80	5.5	68.9
0.90	7.1	144.4
1.00	**8.8**	**228.8**
1.10	10.7	322.1
1.20	12.8	424.3
	% Recovery	**NPV at 10% ($M)**
0.98	87.6	221.3
0.99	88.5	225.0
1.00	**89.4**	**228.8**
1.01	90.3	232.6
1.02	91.2	236.3
	Zinc Price ($/lb)	**NPV at 10% ($M)**
0.80	0.88	106.8
0.90	0.99	167.8
1.00	**1.10**	**228.8**
1.10	1.21	289.8
1.20	1.32	350.8
	Operating Costs ($M)	**NPV at 10% ($M)**
0.95	210.5	236.3
0.98	217.2	231.8
1.00	**221.6**	**228.8**
1.08	239.4	216.7
1.15	254.9	206.2

	Capital Costs ($M)	NPV at 10% ($M)
0.95	83.8	232.0
0.98	86.5	230.1
1.00	**88.2**	**228.8**
1.08	95.3	223.7
1.15	101.5	219.2

FIGURE 1-1 SENSITIVITY ANALYSIS - PRE-TAX NPV



TECHNICAL SUMMARY

PROPERTY DESCRIPTION AND LOCATION

The Rosh Pinah underground zinc-lead mine and 1,880 tpd milling operation is located in southwestern Namibia, 800 km south of Windhoek and 20 km north of the Orange River, at the edge of the Namib Desert. The Rosh Pinah mine has been in continuous operation since 1969 and currently produces zinc and lead sulphide concentrates containing minor amounts of copper, silver, and gold. The zinc and lead concentrates are transported by road to

Luderitz, a port on the Namibian Coast, and then shipped to the international spot markets. The Rosh Pinah mine is 80.08% owned by Glencore and 19.92% by Namibian Broad-Based Empowerment Groupings and an EEPS.

The climate in Rosh Pinah, classified as a warm desert climate, is mostly arid and the most prevalent natural hazard is prolonged periods of drought.

The topography of the immediate Rosh Pinah area is generally flat and borders large hills to the east which rise approximately 400 m above the mine elevation. Elevation varies between 420 m above sea level (MASL) and 800 MASL.

LAND TENURE

On November 13, 1995, the Namibian Ministry of Mines and Energy (MME) granted PE Minerals (Namibia) (Proprietary) Limited (PE Minerals) the Rosh Pinah mining licence (ML), ML 39. The licence is valid for a term of 25 years with an expiry date of November 12, 2020. The licence can be renewed for a further 20 years upon application to the MME. The ML requires payment of an annual fee, development of a works program, environmental compliance, commitment to seek local suppliers for fuel and lubricants, approval of the product take-off agreement, and payment of taxes by permanent employees in Namibia. Mine production is subject to royalties at 3% of net market value payable to the Namibian state and 3% of net market value payable to PE Minerals.

ML 39 covers an area of 782.3405 ha with an Accessory Works (AW) area consisting of 4,432.8 ha. It is mainly located on State Land (State-owned surface rights), however, it overlaps onto farms Namuskluft 88 and Spitskop III.

RPZC currently holds Exclusive Prospecting Licence (EPL) 2616 which allows exploration for base, rare, and precious metals. EPL 2616 covers an area of 19,825.755 ha and overlaps onto Spitskop farm. EPL 2616, originally granted on September 27, 2000, will expire on November 30, 2017.

EXISTING INFRASTRUCTURE

The Rosh Pinah property is directly adjacent to the town of Rosh Pinah, where employees of both the Rosh Pinah and Skorpion Zinc mines reside and a number of private businesses are located.

The mine power is directly supplied from NamPower (national power utility company of Namibia) utility through its grid system. The current demand of the mine is approximately 6.5 MVA and has an installed capacity of 8 MVA with two identical 5 MVA transformers.

Water is supplied by NamWater (Namibia Water Corporation) from the Orange River by means of a ±20 km 250 mm pipeline with two pump stations, a base pump station, and a booster pump station.

HISTORY

The Rosh Pinah mine has been in operation since 1969, excluding a short period during the 1990s when it was under care and maintenance.

In 1964, mineral rights over the mineralization at Rosh Pinah was held by Moly Copper Mining and Prospecting Co. (SWA) Pty Ltd. (Moly Copper). Iscor Ltd. South Africa (Iscor South Africa) decided to explore the Rosh Pinah deposit and drilling commenced in 1965.

Thereafter, sufficient reserves were proven to develop a mine and an operating company, Imcor Zinc, Pty Ltd (Imcor) was formed between Iscor and Moly Copper. Preparatory work and mine development commenced during 1967, with the first ore production starting in May 1969.

A sharp drop in the zinc price towards the end of 1992 led the mine into a loss situation and a subsequent disagreement on the financing of the mine between the shareholders led to the liquidation of the mine in December 1994. After liquidation, and prior to November 20, 2003, Imcor was owned by Kumba Resources Limited (Kumba Resources), PE Minerals and Iscor Namibia. In November 2006, Kumba Resources changed its name to Exxaro Resources Limited (Exxaro). From 2008 until 2012, the Rosh Pinah mine was jointly owned by Exxaro, PE Minerals, Jaguar Investments Four (Proprietary) Limited (Jaguar), and the Employee Empowerment Participation Scheme (EEPS).

On June 11, 2012, Glencore acquired an 80.08% interest in RPZC. The remaining 19.92% is owned by PE Minerals (3.14%), EEPS (1.19%), and Jaguar (15.57%), the Namibian Broad-Based Empowerment Groupings. Glencore is operationally responsible for management of RPZC.

GEOLOGY AND MINERALIZATION

Rosh Pinah mine is hosted by the Rosh Pinah Formation (Hilda Subgroup of the Port Nolloth Group), forming part of the Neoproterozoic Gariep Terrane deposited onto a Palaeo-Mesoproterozoic basement of granite gneisses and supracrustals.

The base metal sulphides at the Rosh Pinah mine are contained within the approximately 30 m thick ore equivalent horizon (OEH). In the Rosh Pinah mine area, the Rosh Pinah Formation has been shown to be at least 1,250 m thick.

The primary mineralization type at the Rosh Pinah mine is a silicified, grey to dark grey, fine-grained and laminated unit locally called microquartzite mineralization. It consists of alternating millimetre to centimetre wide bands of sulphides (sphalerite, pyrite and galena + minor chalcopyrite) and is believed to represent a classic sedimentary-exhalative (SEDEX) style exhalite. The argillite mineralization at the Rosh Pinah mine would be similarly derived, but diluted with background benthonic argillite.

EXPLORATION STATUS

Ever since the discovery of the Rosh Pinah mine, continued in-mine exploration has played a significant role in extending the life of the mine (LOM). The discovery of the WF3 zone has extended the official LOM and further deep-seated mineralization has potential to increase the life of operations far beyond the official LOM.

Exploration targets have been outlined for northern and lower extensions of WF3 as well as for the AAB lens, which is located directly below the mined Southern lens. Geological interpretation utilizing OEH lithology, structures, grades, and existing knowledge of Rosh Pinah geology, has been used to outline an exploration target for WF3 of 10 Mt to 20 Mt grading 6% to 10% Zn, as well as an exploration target for AAB of 0.5 Mt to 1.0 Mt grading 5% to 8% Zn.

The potential quantity and grade is conceptual in nature, and there has been insufficient exploration to define a Mineral Resource, as well, it is uncertain if further exploration will result in the target being delineated as a Mineral Resource.

Recent focus of the regional exploration program was on the Gergarub project, of which RPZC holds a direct 49% interest with Glencore owning an effective interest of 39%. The Gergarub project is located 13 km north of Rosh Pinah where economic concentrations of base metal mineralization were drilled out in joint venture with Skorpion Zinc Mining Company (Pty) Ltd. (Skorpion Zinc). Other targets on the exploration licence are also being investigated.

MINERAL RESOURCES

Geological interpretation and Mineral Resource estimation were completed by Rosh Pinah, and audited by RPA, with an effective date of December 31, 2016. The Mineral Resources have been completed to a level that meets industry standards and are compliant with the terms and definitions provided in CIM definitions as adopted by NI 43-101.

Rosh Pinah Mineral Resources are presented as a series of discrete lenses that are interconnected along the OEH. The dimensions of the envelope containing currently defined ore lenses are approximately 1,800 m long from north to south, 700 m wide from east to west, and 700 m deep at its thickest points.

Rosh Pinah Mineral Resources, estimated as of December 31, 2016, are summarized in Table 1-1. At a cut-off grade of 4% Zn equivalent, total Measured and Indicated Mineral Resources are estimated to be 9,94 Mt grading 7.85% Zn and 1.51% Pb, containing 780,500 t of zinc and 150,200 t of lead. In addition, Inferred Mineral Resources are estimated to be 2.93 Mt grading 5.96% Zn and 1.06% Pb, containing 174,600 t of zinc and 31,000 t of lead.

MINERAL RESERVES

As at December 31, 2016, Proven and Probable Mineral Reserves total 5.1 Mt grading 8.78% Zn, 1.45% Pb, and 20.75 g/t Ag (Table 1-2).

Mineral Reserves are estimated from the Measured and Indicated Mineral Resources. RPA has performed an independent verification of the block model tonnes and grade, and in RPA's opinion, the process has been carried out to industry standards.

The 2016 Mineral Reserve estimation followed a new strategy as compared to previous years. This was primarily driven by a change in methodology and was supported by a new Software suite from Datamine. The approach entailed using Mineable Stope Optimizer (MSO) to determine an array of potentially minable stope shapes per level based on a selection of cut-off grades as determined using a Basic Mining Equation (BME).

The resulting MSO stope shapes are compared to each other and ranked to identify which stopes should be used for further design refinement from which the final Mineral Reserve estimate would be derived.

An approach to include mining dilution and mining recovery per phase of mining has been adopted. This is especially relevant in the WF3 lens where mining commenced in November 2016. From previous mining experience and through geotechnical investigations, the inclusion of a realistic dilution and mining recovery value has been adopted going forward to determine the Mineral Reserve tonnes and grade.

The majority of Mineral Reserves are in the WF3 lens, which is more mineralogically and geotechnically complex than previously mined zones.

MINING METHOD

The Rosh Pinah mine has been in continuous operation since 1969. Underground mining methods are well established. The mine's orebodies are accessed via multiple declines. All mining is mechanized using drill rigs, scooptrams, and underground haulage trucks. Waste is hauled via declines to a surface waste dump or is placed in mined out stopes, where possible. Ore is dumped into an ore pass feeding a grizzly and primary crusher and is subsequently conveyed to the surface process plant.

Annual production is typically 600,000 t to 700,000 t of ore and this is met by three different mining areas supplying a blend of ore types to the concentrator. The blending is carried out to manage the levels of copper, manganese, and iron which detrimentally impact recovery of zinc and lead, as well as to maintain a constant zinc and lead grade feed.

Mining is predominantly by sub-level open stoping, with a small section of the mine being mined using a modified-room-and-pillar method due to a flatter dip. Ore development level spacing for open stoping is between 15 m and 30 m depending on the ore thickness with drive width dimensions of 6 m wide and 4.5 m high.

Blast holes (76 mm) for stoping are drilled from lower levels in a fan pattern using Atlas Copco Simba drill rigs. The burden is 1.9 m and toe spacing is 2.8 m. Emulsion explosives are used. Slot raises for stopes are drilled using an in-the-hole (ITH) drill and are drop-raised, where possible. Extraction of stopes starts on the upper levels and proceeds down dip. No backfill is used in the mine and sill or rib pillars are left where required for geomechanical purposes.

The Rosh Pinah mine utilizes a fleet of Atlas Copco Boomer drill jumbos, seven Elphinstone AD 30 haulage trucks, one Bell 33 haulage truck, remote-capable Elphinstone scooptrams, including one R1300 unit, four R1600 units, and one R1700 unit, and two Atlas Copco Simba ITH dills. In addition, there are various service vehicles including forklifts, scissor lifts, explosive loading units, a roof bolter, a scaler, a secondary breaking unit, and low profile graders.

MINERAL PROCESSING

The process plant includes crushing, screening, and grinding followed by lead/zinc flotation and filtering to produce separate lead and zinc concentrates.

The run of mine (ROM) ore is crushed in a primary crushing station, located underground from where it is conveyed into the beneficiation plant through a series of conveyor belts for further crushing, screening, and grinding.

From the mill feed stockpiles, the ball mill is fed at a rate of 85 tonnes per hour (tph) to 90 tph solids feed. The ball mill is a 1,000 kW Osborn ball mill measuring 12 ft by 12 ft. Sodium cyanide is added in the mill to depress sphalerite and pyrite and Aerophine or Sodium Normal Propyl Xanthate (SNPX) is added to collect the galena. The milling circuit has two stages of cyclone classification in closed circuit with the mill to produce the lead flotation feed with a P_{80} of 106 µm. A third stage of cyclones dewaters the flotation feed slurry to an optimal density.

The product from the milling circuit is sent to a conditioner where frother is added before it passes on to four rougher tank cells. The concentrate from the roughers are sent to the lead column cell and the tails to two scavenger tank cells. Tails from the lead column cells are recycled back to the conditioner and the final concentrate sent to the lead concentrate thickener and belt filter for dewatering. The scavenger concentrates are also recycled back to the conditioner while the scavenger tails become the feed to the zinc circuit which first passes through two parallel intermediate thickeners. The main purpose of the intermediate thickeners is to recover and recycle process water back to the lead and milling circuit. The final lead concentrate from the belt filter is discharged onto a drying floor, where it is dried and stockpiled until loaded onto trucks for dispatch to the port of Luderitz.

The underflow of the intermediate thickeners is fed to two zinc conditioners in series where copper sulphate is added to activate the sphalerite, SNPX added to collect the sphalerite, lime (occasionally to depress pyrite) and frother added. From the conditioners it is fed to a rougher tank cell which has its concentrate fed to a cleaner cell and its tails to a series of four scavenger tank cells. The concentrate from the cleaner cell feeds the final zinc column which in turn produces the final zinc concentrate which is sent to the zinc thickener and belt filter for dewatering. The final zinc concentrate from the belt filter is discharged onto a drying floor, where it is dried and stockpiled until loaded onto trucks for dispatch to the port of Luderitz.

The tails from the cleaner cell is combined with that of the rougher tails that feed the scavenger cells. The final column tails and the scavenger concentrate are both recycled back to the conditioners. The scavenger tails is sent to the tailings thickener. The tailings thickener is redundant and merely serves as surge tank whose “underflow “is pumped to the tailings dam.

PROJECT INFRASTRUCTURE

The mine power is directly supplied from NamPower (national power utility company of Namibia) utility through its grid system.

Water is supplied by NamWater (Namibia Water Corporation) from the Orange River by means of a ±23 km 250 mm pipeline

MARKET STUDIES

Global zinc demand continues to rise by approximately 2% to 3% per annum (or 280,000 t to 420,000 t of zinc metal) driven by gross domestic product (GDP) growth, urbanization, and infrastructure development, and as a “mid-cycle” commodity with expanding markets for consumer goods (automobiles, appliances, etc.). Primary zinc supply is in deficit following the recent closures of global marquee mines (Brunswick-12, Century, and Lisheen). There is consensus forecast of a significantly tightening zinc market over the next several years as supported by both increasing zinc commodity pricing and global zinc smelting shortfalls due to inability to secure sufficient zinc concentrates in addition to decreasing Spot and Annual benchmark smelting charges from 2015 onwards. Wood Makenzie, an independent global commodity forecast consultant, is predicting robust zinc commodity prices over the short term averaging $1.46/lb in 2017 and $1.76/lb in 2018.

In addition, lead, predominantly produced as by-product of zinc mining is also expected to strengthen during this period.

ENVIRONMENTAL, PERMITTING AND SOCIAL CONSIDERATIONS

Rosh Pinah mine has an Occupational Health, Safety and Environment Commitment (HSEC) Policy (2016) outlining their commitment to the prevention of pollution and the undertaking of business in an environmentally sound manner. These commitments are then implemented and managed through a certified ISO 14001:2004 Environmental Management System, which is valid until November 15, 2017. RPZC will need to convert this system to the 2015 ISO 14001 Standard which has been committed for 2017. A certified ISO 14001: 2015 Management System is not a legal requirement, however, it is a best practice principle and provides a benchmark for Environmental Management.

RPZC’s Environmental Management Plans (EMPs) provide the framework for Rosh Pinah mine’s environmental management and includes regular monitoring and bi annual evaluation of environmental performance through compliance audits undertaken by an external consultant.

Mining in Namibia is mainly regulated by the Minerals (Prospecting and Mining) Act 33 of 1992 (Minerals Act) as amended by the Minerals (Prospecting and Mining) Amendment Act 8 of 2008. In terms of the Minerals Act, an Environmental Impact Assessment (EIA) study must be furnished to the Ministry of Environment before a mining project can proceed. It should be noted that while this Act dealt with environmental matters arising from prospecting in mining, the Act predated the Environmental Management Act 7 of 2007 (Environmental Act), which came into force in 2012. The current authorizations for the operation are aligned with the Environmental Act. Finally, the Minerals Act provides that the holder of a mineral licence must take all steps to the satisfaction of the Minister to remedy any damage caused by any mining activities. In the case of larger mining operations, the Minister would almost invariably demand guarantees that could be used by the Ministry to remedy damage caused by mining activities; this is in the form of closure financial liability. Currently, there is no mandatory mechanism for the funding of Final Mine Closure Plan.

In addition, to this overarching environmental legislation, aspect specific legislation is in place, including the Water Act, Act 54 (1956), Nature Conservation Ordinance, No. 4 (1975), Atmospheric Pollution Prevention Ordinance (1976) and the National Heritage Act (2004). All applicable environmental licences were valid at the time of the site visit and document review.

Rosh Pinah has historically been a mining village, built and managed by the mine for the employees of the mine. The town is inclusive of the Skorpion Zinc mine and the Rosh Pinah mine, and a joint-venture private company called RoshSkor was established to manage and operate the town as a private municipality. All services and infrastructure to operate and manage the village are provided through RoshSkor.

RoshSkor is also responsible for the implementation of Corporate Social Responsibility (CSR) projects, which are currently funded between Skorpion Zinc and RPZC. RPZC is approached with various projects and assists with the funding for projects aligned with its corporate objectives. Programs include training in basic needlework, hand weaving of carpets, development initiatives in the informal settlement of Tutengeni which involves the upgrade of a school, training of locals for the removal of waste and waste segregation, cleaning of enviroloos, etc. Should Skorpion Zinc cease operations and/or retract funding in the town for CSI projects, there may be a risk that the local inhabitants of Rosh Pinah will turn to RPZC for greater assistance with funding. In addition, should Skorpion Zinc cease to operate, RPZC will need to implement a strategy to deal with the high unemployment rates in the town and provide additional assistance in developing small micro scale business enterprises that are self-sustainable post the life of mine.

Key social challenges include strike action at the mine, critical skill availability in the local area, and relationship management with the workforce when it comes to change management in the operation. Strikes/ labour unrest pose a risk to the operation. Stakeholder Management Plans will need to be developed and implemented successfully to manage this aspect of the operation.

CAPITAL COSTS

Sustaining capital is mainly for equipment maintenance, exploration, mine development, mine equipment, process plant upgrades, and administration and information technology (IT). The business improvement capital of $7.3 million in 2017 is for the regrind project.

Table 1-5 presents the LOM sustaining capital.

TABLE 1-5 LIFE OF MINE SUSTAINING AND BUSINESS IMPROVEMENT CAPITAL COSTS
Trevali Mining Corporation – Rosh Pinah Mine

($ M)	2017	2018	2019	2020	2021	2022	2023	2024	Total
Engineering & HSEC	1.8	1.2	0.7	0.9	0.9	0.9	0.9	0.9	**8.2**
Exploration	0.9	1.0	1.0	0.8	0.0	0.0	0.0	0.0	**3.7**
Mine Development	6.7	7.1	7.0	3.1	0.0	0.0	0.0	0.0	**24.0**
Mining Equipment	3.0	5.8	4.1	5.0	5.0	5.0	5.0	5.0	**37.9**
Plant	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	**0.7**
Administration & IT	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	**1.5**
Total Sustaining	**13.0**	**15.5**	**13.2**	**10.0**	**6.1**	**6.1**	**6.1**	**6.1**	**76.0**
Business Improvement	7.3	1.1	-	-	-	-	-	-	8.4
Reclamation	-	-	-	-	-	-	-	3.8	3.8
Total Capital	**20.3**	**16.6**	**13.2**	**10.0**	**6.1**	**6.1**	**6.1**	**9.9**	**88.2**

OPERATING COSTS

Table 1-6 details the forecast LOM operating costs per tonne milled. The operating costs are based upon a continuation of the current operations and operating practices.

TABLE 1-6 LIFE OF MINE OPERATING COSTS
Trevali Mining Corporation – Rosh Pinah Mine

($/t Milled)	2017	2018	2019	2020	2021	2022	2023	2024	Total
Mining	19.01	18.48	18.16	18.00	18.07	18.09	17.05	17.05	**18.04**
Processing	11.37	11.05	10.86	10.77	10.81	10.82	10.20	10.20	**10.79**
Maintenance	8.88	8.64	8.49	8.41	8.44	8.45	7.97	7.97	**8.43**
Administration	6.62	6.72	6.90	7.29	7.32	7.32	6.90	6.90	**7.01**
Total	**45.88**	**44.89**	**44.42**	**44.47**	**44.64**	**44.69**	**42.12**	**42.12**	**44.26**

2 INTRODUCTION

Roscoe Postle Associates Inc. (RPA) was retained by Trevali Mining Corporation (Trevali) to prepare an independent Technical Report on the Rosh Pinah mine, located in Namibia. The purpose of this report is to document the Mineral Resource and Mineral Reserve estimates, prepared by Rosh Pinah Zinc Corporation (Proprietary) Limited (RPZC) and audited by RPA as of December 31, 2016. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects.

Trevali is a zinc-focused, base metals mining company with two commercially producing operations. Trevali is actively producing zinc and lead-silver concentrates from its 2,000 tpd Santander mine in Peru and its 3,000 tpd Caribou mine in the Bathurst Mining Camp of northern New Brunswick, Canada.

Rosh Pinah is an underground mine, producing zinc and lead concentrates, with copper, silver, and gold as by-products under an agreement with PE Minerals (Namibia) (Proprietary) Limited (PE Minerals). The sulphides are concentrated in a flotation plant using separate zinc and lead circuits. The zinc and lead concentrates are transported by road to Luderitz, a port on the Namibian Coast, and then shipped to the international smelters and refineries.

The Rosh Pinah deposit was first discovered in 1963. Drilling commenced in 1965 and shortly thereafter sufficient reserves were proven to develop a mine and an operating company was formed (Imcor Zinc, Pty Ltd). Preparatory work and mine development commenced during 1967, with the first ore production starting in May 1969. Mining was halted from 1993 to 1995 due to mine liquidation. In 1996, the mining rights were awarded to PE Minerals and in 1998, RPZC was formed from a joint venture. On June 11, 2012 Glencore acquired an 80.08% interest in RPZC. The remaining 19.92% is owned by Namibian Broad-Based Empowerment Groupings and an EEPS. Glencore is operationally responsible for management of RPZC.

Since discovery of the mine, continued exploration has played a significant role in extending the life of mine. Recent focus of the regional exploration program was on the Gergarub project, of which RPZC holds a direct 49% interest with Glencore owning an effective interest of 39%. The Gergarub project is located 13 km north of Rosh Pinah where economic concentrations of base metal mineralization were drilled out in joint venture with Skorpion Zinc Mining Company (Pty) Ltd. (Skorpion Zinc), a subsidiary of Vedanta Resources plc (Vedanta). Other targets on the exploration licence are also being investigated.

SOURCES OF INFORMATION

A site visit was carried out from January 25 to 27, 2017 by Mr. Torben Jensen, P.Eng., RPA Principal Mining Engineer, Mr. Ian Blakley, P.Geo., RPA Principal Geologist, and Ms. Tracey Jacquemin, Pr.Sci.Nat., Advisian Position Manager, Environment and Society Mining, Sub-Saharan Africa. The site visit included the mine, processing plant, exploration licence area (including the Gergarub project), and the local community.

Discussions were held with the following Rosh Pinah personnel:

- Mr. Christo Horn, Chief Operating Officer.
- Mr. Gerbrand V Heerden, Chief Financial Officer and Business Improvement Manager.
- Mr. Andre Bergh, Engineering Manager.
- Mr. Ekhard Kruger, Mining Manager.
- Ms. Sheron Kaviua, Mineral Resource Manager.
- Mr. Linus Flavianu, Senior Exploration Geologist.
- Mr. Daan van Staden, Plant Manager.
- Mr. Kondja Kaulinge, Human Resources & Engagement Manager.
- Ms. Juliet Yisa, Health, Safety, Environment and Community Manager.

Mr. Blakley reviewed the geology, sampling, assaying, and resource estimate work and is responsible for Sections 2 to 12, 14, and 23. Mr. Jensen reviewed the mining, reserve estimate, and economics and is responsible for Sections 15, 16, 18, 19, 21, and 22. Ms. Jacquemin reviewed the environmental, and permitting aspects and is responsible for Section 20. Mr. Krutzelmann reviewed the metallurgical, aspects and is responsible for Sections 13 and 17. The authors share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27 References.

LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the metric system. All currency in this report is US dollars (US$) unless otherwise noted.

a	annum	kWh	kilowatt-hour
A	ampere	L	litre
bbl	barrels	lb	pound
btu	British thermal units	L/s	litres per second
°C	degree Celsius	m	metre
C$	Canadian dollars	M	mega (million); molar
cal	calorie	m^2	square metre
cfm	cubic feet per minute	m^3	cubic metre
cm	centimetre	µ	micron
cm^2	square centimetre	MASL	metres above sea level
d	day	µg	microgram
dia	diameter	m^3/h	cubic metres per hour
dmt	dry metric tonne	mi	mile
dwt	dead-weight ton	min	minute
°F	degree Fahrenheit	µm	micrometre
ft	foot	mm	millimetre
ft^2	square foot	mph	miles per hour
ft^3	cubic foot	MVA	megavolt-amperes
ft/s	foot per second	MW	megawatt
g	gram	MWh	megawatt-hour
G	giga (billion)	oz	Troy ounce (31.1035g)
Gal	Imperial gallon	oz/st, opt	ounce per short ton
g/L	gram per litre	ppb	part per billion
Gpm	Imperial gallons per minute	ppm	part per million
g/t	gram per tonne	psia	pound per square inch absolute
gr/ft^3	grain per cubic foot	psig	pound per square inch gauge
gr/m^3	grain per cubic metre	RL	relative elevation
ha	hectare	s	second
hp	horsepower	st	short ton
hr	hour	stpa	short ton per year
Hz	hertz	stpd	short ton per day
in.	inch	t	metric tonne
in^2	square inch	tpa	metric tonne per year
J	joule	tpd	metric tonne per day
k	kilo (thousand)	US$	United States dollar
kcal	kilocalorie	USg	United States gallon
kg	kilogram	USgpm	US gallon per minute
km	kilometre	V	volt
km^2	square kilometre	W	watt
km/h	kilometre per hour	wmt	wet metric tonne
kPa	kilopascal	wt%	weight percent
kVA	kilovolt-amperes	yd^3	cubic yard
kW	kilowatt	yr	year

3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA for Trevali. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Trevali and other third party sources.

For the purpose of this report, RPA has relied on ownership information provided by Trevali. Trevali has relied on an opinion by H.D. Bossau & Co., Legal Practitioners/Notaries of Windhoek, Namibia dated March 17, 2017 entitled Title review opinion in respect of the status of mineral licences in the Republic of Namibia held by P.E. Minerals (Namibia) (Proprietary) Limited, and this opinion is relied on in Sections 4 and the Summary of this report. RPA has not researched property title or mineral rights for the Rosh Pinah mine and expresses no opinion as to the ownership status of the property.

RPA has relied on Trevali for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Rosh Pinah mine.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4 PROPERTY DESCRIPTION AND LOCATION

The Rosh Pinah underground zinc-lead mine and 1,880 tpd milling operation is located in southwestern Namibia, 800 km south of Windhoek and 20 km north of the Orange River, at the edge of the Namib Desert between Diamond Area No.1 and the farms Namuskluft 88 and Spitskop (Figure 4-1).

Namibia is a sub-Saharan African nation, bordering Angola (1,376 km), Botswana (1,360 km), South Africa (967 km), Zambia (233 km) and the South Atlantic Ocean. The country has a total land area of 823,290 km^2, of which a mere 1,002 km^2 are covered by water.

The geographic co-ordinates of the Rosh Pinah mine, based on the location of the main gate, are coordinates 27°57'19.86"S and 16°45'51.25"E.

MINERAL RIGHTS AND LAND OWNERSHIP

In Namibia, all mineral rights to the property are vested in the State. The minerals industry in Namibia is administered by the Minister of Mines and Energy (Namibian Ministry of Mines and Energy (MME)), assisted by the Mining Commissioner and the Minerals Board of Namibia.

Mining law in Namibia is mainly regulated by the Minerals (Prospecting and Mining) Act 33 of 1992 (Minerals Act) [as amended by Minerals (Prospecting and Mining) Amendment Act 8 of 2008]. This Act deals with the granting of access to mineral resources (www.mme.gov.na/mines/mrrd/) through the following licence types:

Non-Exclusive Prospecting Licence (NEPL): Any person may apply for a non-exclusive Prospecting licence, provided, in the case of a natural person, such person has reached the age of 18 years. The licence is valid for six months and it is non-renewable.

Mining Claim (MC): Available only to Namibian citizens for the development of small-scale mining. Mining claims are valid for three years and two-year extension periods are possible provided that the claim is being developed or worked. Up to a maximum of ten claims can be held at any one time.

Figure 4-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Location Map

April 2017

Source: Ezilon.com website, 2017.

Reconnaissance Licence (RL): Designed for regional, mainly remotely sensing exploration, a reconnaissance licence is valid for six months on a non-renewable basis. This licence facilitates the identification of exploration targets.

Exclusive Prospecting Licence (EPL): This three year licence allows systematic prospecting in areas of up to 1,000 km^2. It gives exclusive exploration rights to the land and may be extended twice for two-year periods if demonstrable progress is shown. Renewals beyond seven years require special approval from the Minister.

Mining Licence (ML): This gives the holder the exclusive mining right in the licence area for a period of 25 years or the life of the mine, with renewals for a further 20 years upon application to the MME. The holder is required to demonstrate the financial and technical ability to develop and operate a mine.

Mineral Deposit Retention Licence (MDRL): This allows an exploration company in certain circumstances to retain tenure on a prospecting licence, mining licence, or mining claim without mining obligations. It is valid for five years, with two-year renewal periods. The licence holder must, however, meet work and expenditure obligations and submit regular project reviews.

Transfers or Joint ventures (JV), as well as Amendments involving the addition of a commodity group and/or increase/decrease in area size are applicable to the mine to all mineral licences described above except the NEPL.

The relevant RPZC licences include Mining Licence 39 and Exclusive Prospecting (Exploration) Licence 2616 (Figures 4-2, 4-3, and 4-4).

MINING LICENCE 39

On November 13, 1995, the Namibian Ministry of Mines and Energy (MME) granted PE Minerals the Rosh Pinah mining licence, ML 39. The ML was granted in accordance with the Minerals Act. The licence is valid for a term of 25 years with expiry of November 12, 2020. The licence can be renewed for a further 20 years upon application to the MME. The ML requires payment of an annual fee, development of a works program, environmental compliance, commitment to seek local suppliers for fuel and lubricants, approval of the product take-off agreement, and payment of taxes by permanent employees in Namibia.

ML 39 (Figures 4-2 and 4-3) covers an area of 782.3405 ha with an Accessory Works (AW) area consisting of 4,432.8 ha. It is mainly located on State Land (State-owned surface rights), however, it overlaps onto farms Namuskluft 88 and Spitskop III.

EXCLUSIVE PROSPECTING (EXPLORATION) LICENCE 2616

RPZC currently holds EPL 2616 which allows for exploration for base, rare, and precious metals. EPL 2616 covers an area of 19,825.755 ha and overlaps onto Spitskop farm. EPL 2616, originally granted on September 27, 2000, will expire on November 30, 2017. RPZC is currently preparing a renewal application.

RPZC has applied for a mineral retention licence over the mining area covering the Gergarub mineral deposit for future development. Negotiations are ongoing with the JV partner, Skorpion Zinc. EPL 2616 was endorsed by the Ministry of Mines and Energy on November 16, 2016. On expiry of the EPL 2616, RPZC will re-apply on the basis of further exploration activities. RPZC does not foresee any reason for the application to be denied.

SURFACE RIGHTS

Ancillary rights agreements are in place for farms Namuskluft 88, Spitskop III, and Spitskop Wes 128. All other areas overlain by the EPLs are state owned land and no surface right agreements are required.

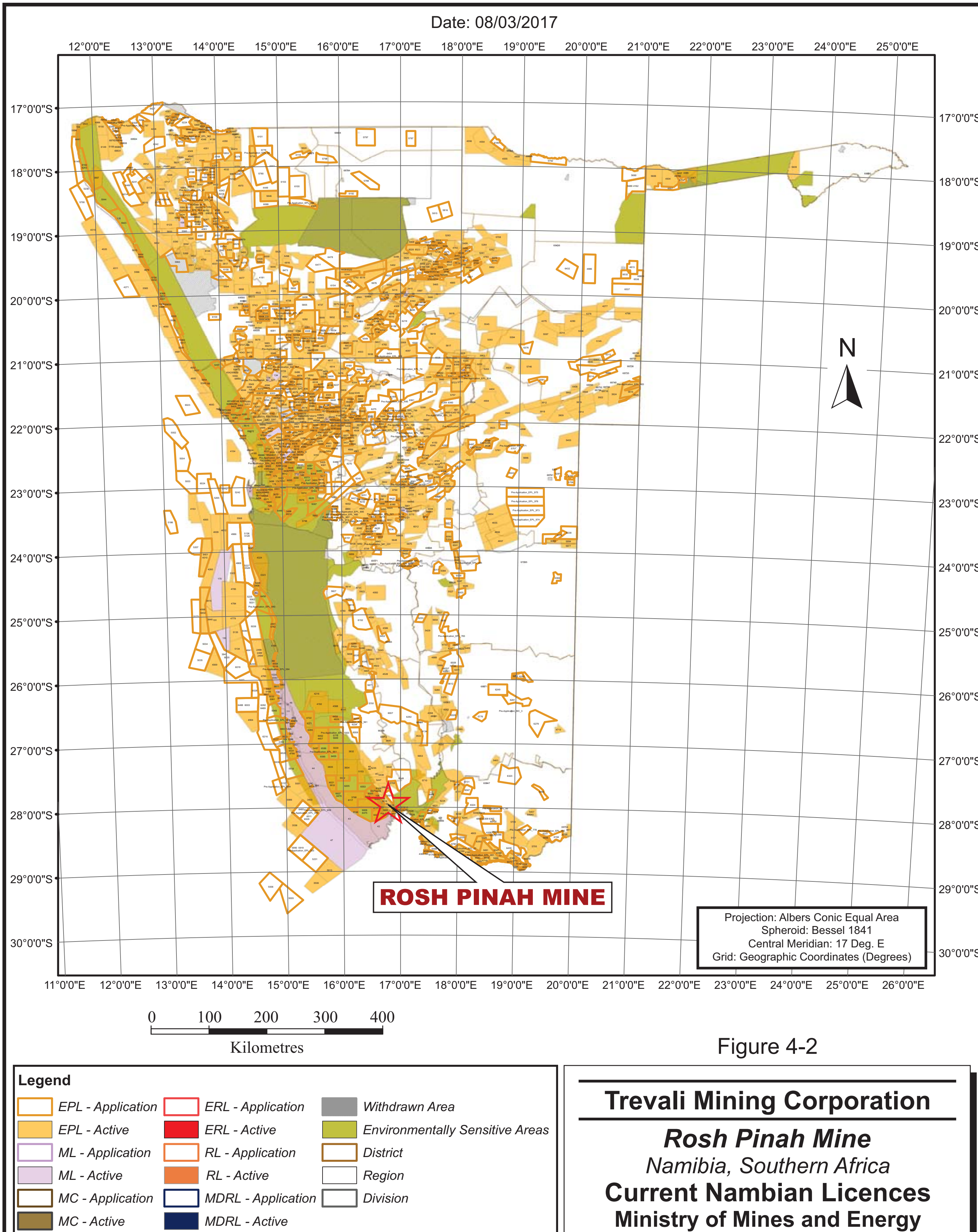


Figure 4-2

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Current Nambian Licences
Ministry of Mines and Energy
as of March 8, 2017

April 2017

Source: http://mme.gov.na/files/publications/2b0_LicMap1_2000000_03-08-2017_11.00.03.pdf

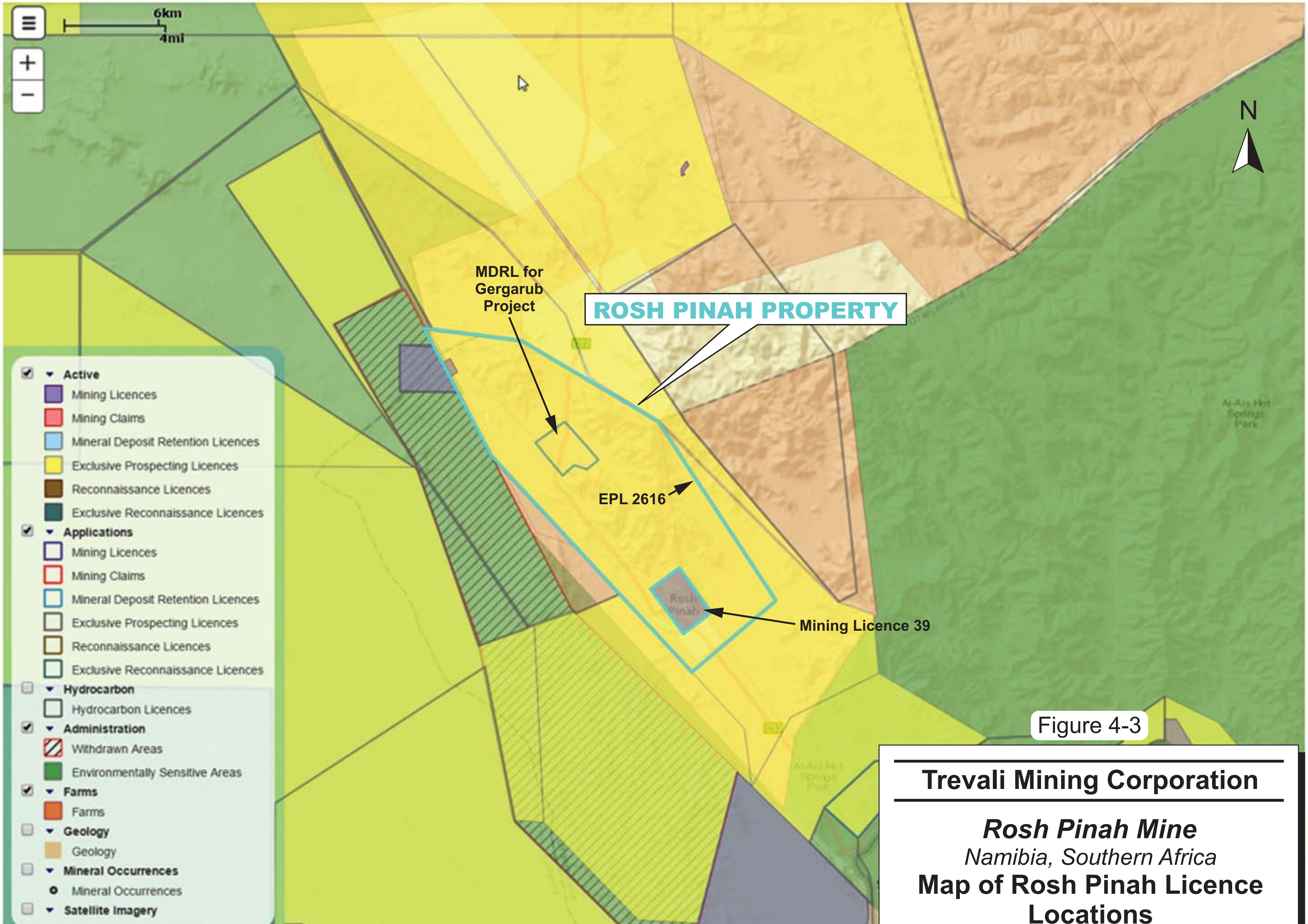


Figure 4-3

Trevali Mining Corporation

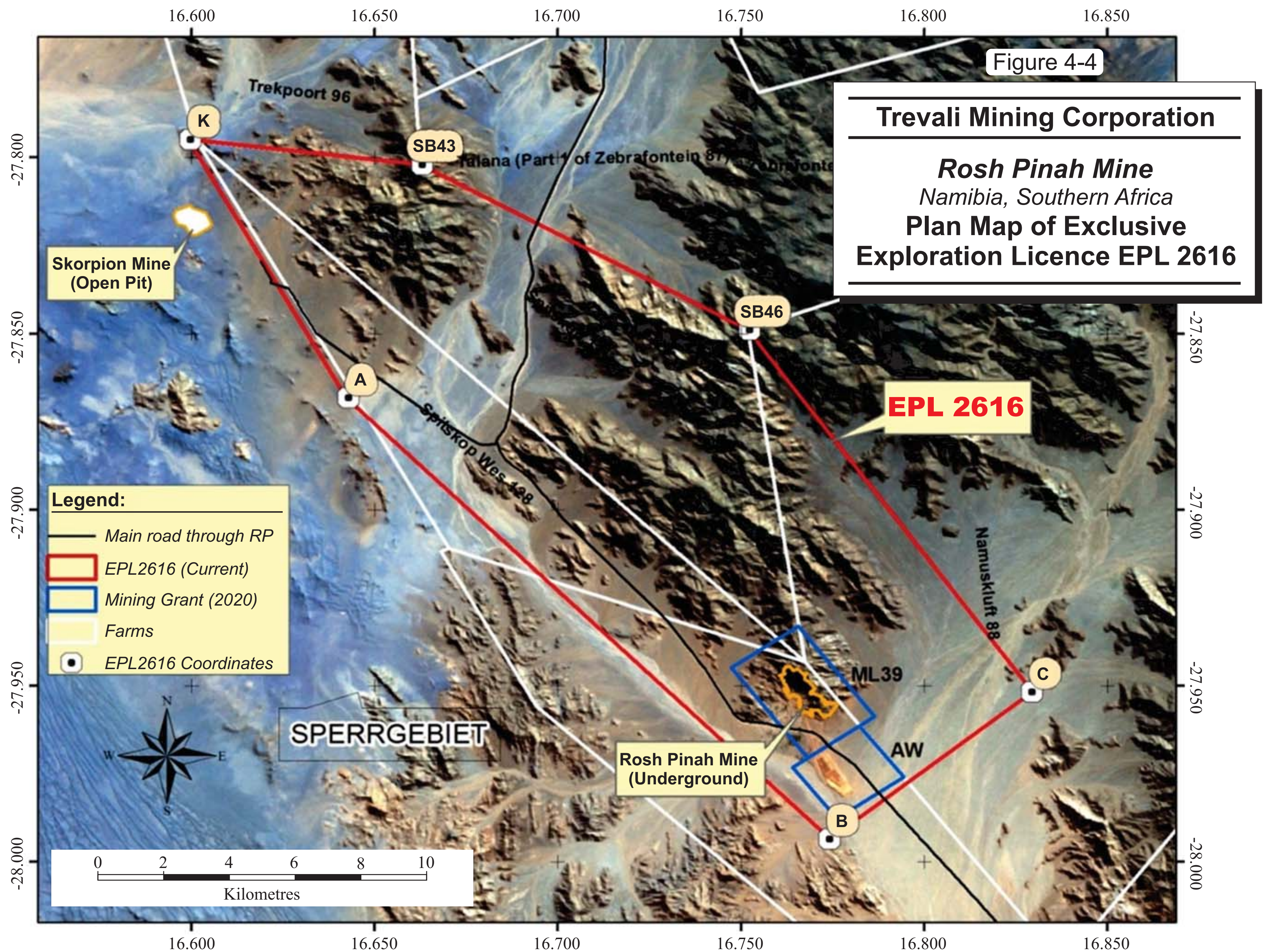
Rosh Pinah Mine

Namibia, Southern Africa

Map of Rosh Pinah Licence Locations

April 2017

Source: http://portals.flexicadastre.com/Namibia/, 2017.



April 2017

Source: Rosh Pinah Zinc Corp., 2016.

www.rpacan.com

ROYALTIES AND LEASE OBLIGATIONS

The Rosh Pinah mine is not subject to any back-in rights payments, agreements, or encumbrances. The corporate tax rate in Namibia for mining properties is a flat rate of 37.5%. Corporate taxes of 34% applies to taxable income from non-mining activities.

Mine production is subject to royalties at 3% of net market value payable to the Namibian State and 3% of net market value payable to PE Minerals. Additionally, production is subject to the provisions of Section 114 of the Minerals Act. Detailed quarterly and annual reports on all relevant aspects of operations must be submitted.

Allowable tax deductions for mining companies are as follows:

- All pre-production exploration expenditures are fully deductible in the first year of production; to the extent that this deduction exceeds income from mining operations for the year concerned, it will create an assessed loss for carry forward or set off against other income of the taxpayer.

- Subsequent exploration expenditures are not ring fenced and are fully deductible in the year they occur, so that profits from existing operations can be used to fund exploration in any part of the country.

- Initial and subsequent development costs (include all capital expenditure incurred in connection with the development operations) are fully deductible in equal installments over three years commencing in the year the mine starts production.

- Operating expenses incurred in the production of income are deductible for tax purposes.

The Minerals Act also makes provision for a penalty royalty (for the failure of beneficiating minerals in Namibia, where such beneficiation is possible, transfer pricing arrangements and excessive brokerage fees) as well as for a windfall royalty.

RPA is not aware of any environmental liabilities on the property. RPZC has all required permits to conduct the work on the property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

ACCESSIBILITY

The Rosh Pinah mine is located in the Oranjemund Constituency of the Karas Region in southern Namibia. The Rosh Pinah property is directly adjacent to the town of Rosh Pinah, which is host to employees of both the Rosh Pinah and Skorpion Zinc mines and a number of private businesses. The town of Rosh Pinah lies along a major tourism route within the Ai-Ais Richtersveld Transfrontier Park.

The nearest commercial airport is located at Oranjemund, approximately 105 km southeast of Rosh Pinah, via gravel road C13. Rosh Pinah is located approximately 800 km south of Windhoek, Namibia's capital city. Aus, the nearest railhead on the Luderitz - Keetmanshoop line, is accessed by a 165 km paved road. Skorpion Zinc also operates a private airstrip.

CLIMATE

Namibia is located in the southwestern part of sub-Saharan Africa and experiences more than 300 days of sunshine annually. The climate in Rosh Pinah, classified as a warm desert climate, is mostly arid and the most prevalent natural hazard is prolonged periods of drought. Wind is gusty, but averages approximately 8 km/h. Rainfall is sparse and erratic, and most prevalent on either side of the summer season, between September and November and between February and April.

From October to April, the mean daily temperatures are approximately 30°C to 34°C with cooler nights at a mean daily minimum of approximately 13°C to 17°C. Daytime highs can reach greater than 40°C in the summer months. Precipitation during this period averages approximately 12 mm per month.

From May through September, the mean daily temperatures are approximately 23°C to 29°C with cooler nights at a mean daily minimum of approximately 7°C to 12°C. Cold winter nights can reach 2°C during these months. Precipitation during this period averages approximately 4 mm per month.

LOCAL RESOURCES

Namibia has a long history of mining activity and mining suppliers and contractors are locally available. According to BDO Namibia (http://www.bdo.com.na/en-gb/industries/natural-resources/mining-in-namibia), mining contributes up to 25% of Namibia's income and is the largest contributor to the Namibian economy. Rosh Pinah labour is sourced from the local Karas Region, from the northern parts of Namibia, and from the Damara-, Ovambo- and Okavango-speaking people who have semi-permanently settled in the town of Rosh Pinah. Experienced professional staff are readily available, either within Namibia, or in the adjacent countries with rich mining histories.

The town of Rosh Pinah, which does not fall under any regional government authority, is jointly governed by the mine operators through a joint-venture private company called RoshSkor which was established to manage and operate the town as a private municipality. All services and infrastructure to operate and manage the town are provided through RoshSkor. The Rosh Pinah mine provides housing for its employees on a rental basis. The town of Rosh Pinah has grown substantially since 2002 when Anglo American commenced construction of the Skorpion Zinc mine, located 21 km south of the town. The town has a population of about 15,000 inhabitants and is regarded as one of the fastest growing village councils in the Karas Region.

The Project enjoys the support of local communities.

INFRASTRUCTURE

At the time of RPA's site visit, the surface and underground infrastructure at the Rosh Pinah mine included the following:

- Administration Building
- Human Resources Building
- Security Building
- Safety/Health/Environment Building

- Drill and Blast Workshop
- Load and Haul Workshop
- Welding and Fitter Workshop
- Maintenance Offices
- Mining Office
- Geology Office
- Core Storage Facilities
- Change Facilities
- Plant Workshop
- Warehouse & Reagents Storage
- Laboratory
- MCC Building (Switchrooms)
- Process Control Rooms
- Plant Office
- Warehouses and Stores Yards
- Accommodations for mine employees
- Firefighting equipment including a fire truck
- Diesel storage tanks (two) with a capacity of 82,000 L and 23,000 L

POWER

The mine power is directly supplied from NamPower (national power utility company of Namibia) utility through its grid system. The current demand of the mine is approximately 6.5 MVA and has an installed capacity of 8 MVA with two identical 5 MVA transformers. Approximately 2.5 MVA feeds the plant and the rest feeds the mine, predominately for ventilation. A spare 5 MVA transformer was purchased in 2014 to serve as back-up for the existing units. No emergency power supply exists.

WATER

Water is supplied by NamWater (Namibia Water Corporation) from the Orange River by means of a ±23 km 250 mm pipeline with two pump stations, a base pump station, and a booster pump station, each consisting of two pumps (one running and one standby). Water is delivered at a rate of 140 m^3/h to 150 m^3/h to a 3,300 m^3 industrial water reservoir on the mine site. The pumping stations stop/start automatically to maintain the reservoir level >90%. A reservoir bypass line also exists which allows for direct water supply to the process plant. The total water supply is 1.2 million m^3 per annum.

Industrial water is supplied to the plant either from the reservoir via gravity and/or directly through the bypass line. The average water consumption is ±1.55 m^3/t feed ore. Approximately 160 m^3/day of the industrial water is taken from the reservoir and converted to potable water by chlorination and pumping through two pressure filters to a 600 m^3 potable water reservoir. The potable water is supplied via gravity to onsite users. In cases of emergency, water can be transferred from two RoshSkor town water reservoirs to the onsite industrial water reservoir.

A series of pump stations and sumps/tanks underground is used to collect, store and pump underground water to surface. On surface the water is collected in tanks and a catchall dam for re-circulation back underground, dust suppression, and irrigation of the golf course.

PHYSIOGRAPHY

The topography of the immediate Rosh Pinah area is generally flat and borders large hills to the east which rise approximately 400 m above the mine elevation. Elevation varies between 420 MASL and 800 MASL. The desert geology consists of sand seas near the coast, while gravel plains and scattered mountain outcrops occur further inland. The Project is located on the edge of the Namib coastal desert, and as such, there is only sparse vegetation. Although the outer Namib is largely barren of vegetation, lichens and succulents are found in coastal areas, while grasses, shrubs, and ephemeral plants thrive near the escarpments. A few types of trees are also able to survive the extremely arid climate.

6 HISTORY

The Rosh Pinah (Jewish word for “corner stone”) mine has been in operation since 1969, excluding a short period during the 1990s when it was under care and maintenance.

PRIOR OWNERSHIP

In 1964 mineral rights over the mineralization at Rosh Pinah was held by Moly Copper Mining and Prospecting Co. (SWA) Pty Ltd. (Moly Copper). Moly Copper, owned by the Kahn family, operated the small Lorelei mining operation between 1950 and 1957, however, operations ceased due the limited size of this small porphyry deposit. Iscor Ltd. South Africa (Iscor South Africa) decided to explore the Rosh Pinah deposit and drilling commenced in 1965.

Thereafter, sufficient reserves were proven to develop a mine and an operating company, Imcor Zinc, Pty Ltd (Imcor) was formed between Iscor and Moly Copper. Preparatory work and mine development commenced during 1967, with the first ore production starting in May 1969.

A sharp drop in the zinc price towards the end of 1992 led the mine into a loss situation and a subsequent disagreement on the financing of the mine between the shareholders led to the liquidation of the mine in December 1994. After liquidation, and prior to November 20, 2003, Imcor was owned by Kumba Resources Limited (Kumba Resources), PE Minerals and Iscor Namibia. In November 2006, Kumba Resources changed its name to Exxaro Resources Limited (Exxaro). In November 2006, Kumba Resources changed its name to Exxaro Resources Limited (Exxaro). From 2008 until 2012, the Rosh Pinah mine was jointly owned by Exxaro, PE Minerals, Jaguar Investments Four (Proprietary) Limited (Jaguar), and the Employee Empowerment Participation Scheme.

On June 11, 2012, Glencore acquired an 80.08% interest in RPZC. The remaining 19.92% is owned by Namibian Broad-Based Empowerment Groupings and an EEPS. Glencore is operationally responsible for management of RPZC.

EXPLORATION AND DEVELOPMENT HISTORY

In May 1963, M.D. McMillan commenced mapping the Witputs – Sendelingsdrif area as part of his PhD study at the Precambrian Research Unit at the University of Cape Town and collected rock samples. The weight of the samples indicated the presence of barite (barium sulphate). On further investigation McMillan came upon a rock outcrop stained green by copper oxides, which can be considered as the discovery of the Rosh Pinah deposit.

In December 1964, McMillan mapped the outcropping gossans. The assay results returned economic grades of zinc and lead.

Ever since the discovery of the Rosh Pinah mine, continued in-mine exploration has played a significant role in extending the life of the mine (LOM). The discovery of the WF3 zone has extended the current LOM and further deep-seated mineralization has potential to increase the life of operations far beyond the current LOM.

Recent focus of the regional exploration program was on the Gergarub project, of which RPZC holds a direct 49% interest. The Gergarub project is located 13 km north of Rosh Pinah where economic concentrations of base metal mineralization were drilled out in joint venture with Skorpion Zinc. Other targets on the exploration licence are also being investigated.

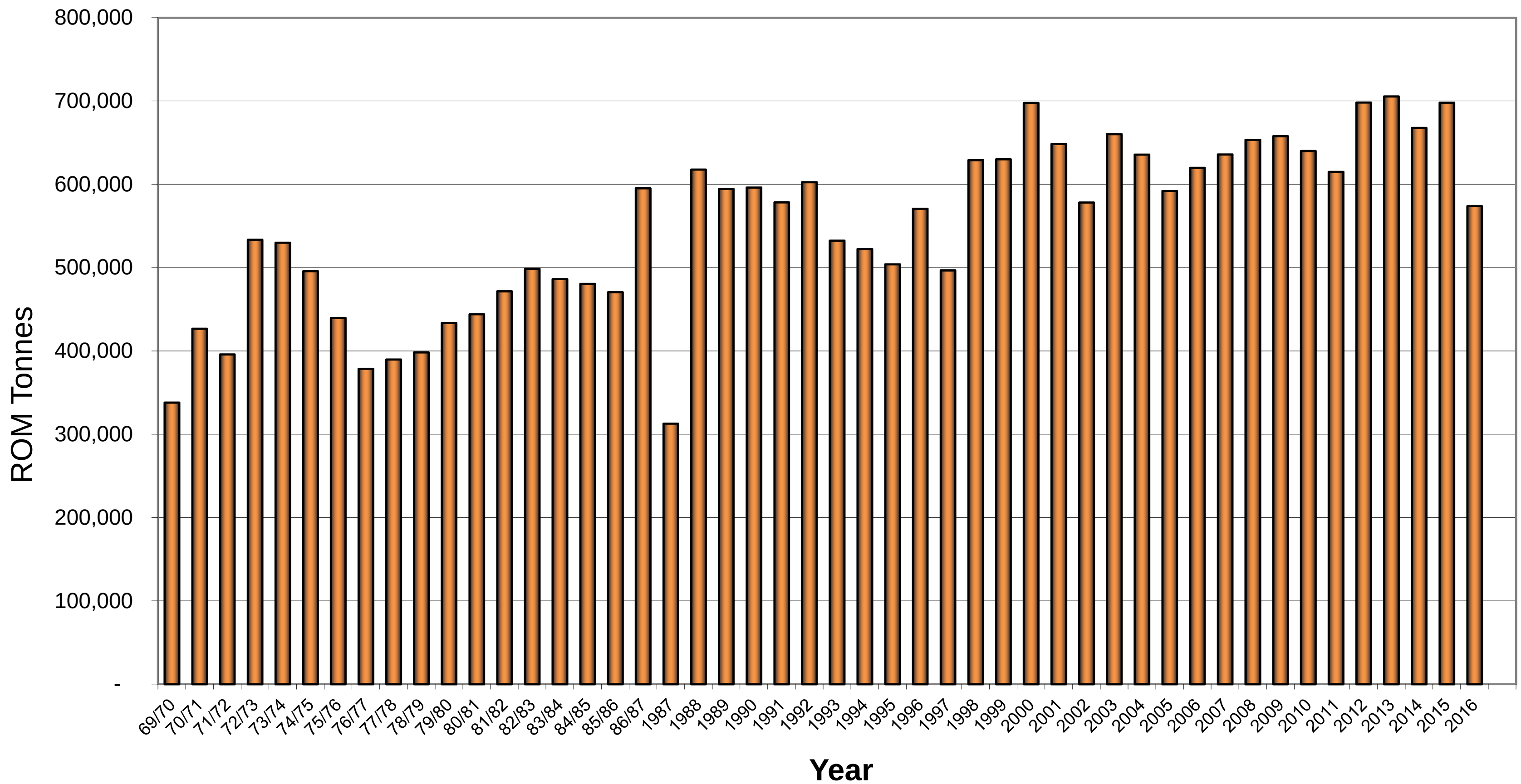
HISTORICAL RESOURCE ESTIMATES

No historical estimates are relevant to this report.

PAST PRODUCTION

Since commencing mining operations in 1969 to the end of 2016, a total of 26.4 million tonnes have been mined from the various orebodies at Rosh Pinah. The average annual production over the last 20 years is approximately 640,000 tpa (Figure 6-1).

FIGURE 6-1 ROSH PINAH ANNUAL ROM PRODUCTION



7 GEOLOGICAL SETTING AND MINERALIZATION

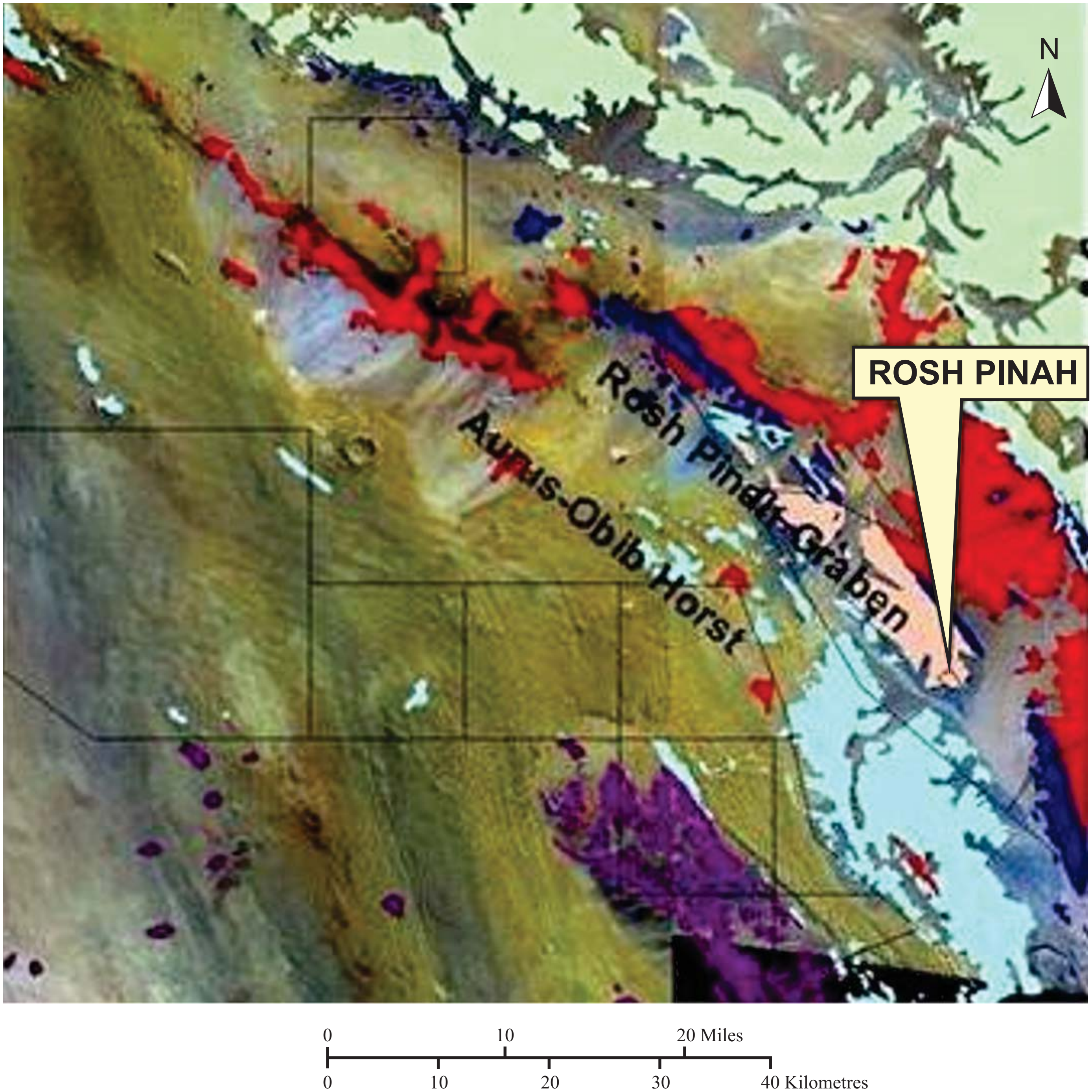
REGIONAL GEOLOGY

Rosh Pinah mine is hosted by the Rosh Pinah Formation (Hilda Subgroup of the Port Nolloth Group), forming part of the Neoproterozoic Gariep Terrane deposited onto a Palaeo-Mesoproterozoic basement of granite gneisses and supracrustals (Figure 7-1). The Gariep Terrane is divided into two distinct tectono-stratigraphic sub-terranes; the eastern, para-autochthonous Port Nolloth Group and the western, allochthonous Marmora Terrane.

The Port Nolloth Group is a curved belt stretching from Port Nolloth in South Africa to Luderitz in Namibia via Rosh Pinah and the coastal region of Bogenfels. The lowermost stratigraphic unit of the Port Nolloth Group is the Stinkfontein Subgroup, which consists of basal conglomerate and quartzite of the Lekkersing Formation and the feldspathic quartzite and minor felsic volcanics of the Vredefontein Formation. The Kaigas Formation consists of diamictite presumably of glacial origin (Frimmel et al., 1996; Harland, 1983; Hambray and Harland, 1985). This diamictite is overlain by a predominantly calcareous sequence of intercalated pelites, feldspathic litharenites, quartzites, and meta-conglomerates of the Hilda Sub-group (Alchin, 1993). In the Rosh Pinah region, massive felsic lava flows and pyroclastic rocks grade into the sedimentary strata of the Hilda Sub-group.

The Hilda Subgroup is unconformably overlain by the Numees Formation, which consists of banded iron formation, quartzite, pelite, and massive glaciogenic diamictite. Unconformably overlying the Numees Subgroup is the Holgat Sub-group, which is composed of turbiditic meta-arkose, meta-greywacke, metapelite, and H2S-rich marbles.

Located to the west of Rosh Pinah, the Marmora Sub-terrane of the Gariep Terrane is an allochthonous belt that is interpreted as obducted ocean floor, consisting of a mixed package of sediments, volcanics, and intrusives. The Marmora Terrane is further sub-divided into the Schakalsberg Sub-terrane, the Oranjemund Sub-terrane, and the Chameis Sub-terrane. To the east of Rosh Pinah, the Nama Group unconformably overlies the basement rocks and thins out towards the east with selected units wedging out completely. North of the Gariep River, the Nama Group is divided into the Fish River, Schwarzrand, and Kuibis Sub-groups.



Legend:

NAMA GROUP

MARMORA TERRANE

PORT NOLLOTH TERRANE

Glacial diamictites

Carbonates

Immature arenited

GRANITOID BASEMENT

Figure 7-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Regional Geology

(Terrane Map on Satellite Image Showing the Rosh Pinah Graben & the Aurus-Orib Horst)

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

STRUCTURAL GEOLOGY

Sinistral, oblique collision of the Rio de la Plata and Kalahari cratons at approximately 540 Ma resulted in multiphase deformation comprising a roughly, north-south D1 compression, followed by a west-southwest/east-northeast D2 compression of the ore equivalent horizon (OEH) which contains the base metal sulphides at the Rosh Pinah mine. F1 folds comprise roughly south verging overfolds, refolded by the penetrative west-southwest-verging overfolds of F2. A major F1 anticlinal axis running approximately through the centre of the mine, refolded by F2, gives rise to the locally named “Rosh Pinah Anticlinorium”. It causes steep to inverted plunges of F2 in A-mine and Eastern Orefield and produces sheet folds in the southern parts of the mine.

Folding is disharmonic due to a competency contrast between the arenites, argillites (microquartzite), and carbonates resulting in the formation of saddle reefs and keel type mineralization.

Syn- and post-tectonic shearing and faulting has added further structural complications and is believed to have divided the A-mine and Southern Orefield into two structural domains.

The Rosh Pinah deposit meets the erosional surface in several places at the apex of folds in the central part of the Rosh Pinah Anticlinorium, however, around the periphery dome, especially in the south of the mine, the ore continues at depth.

To the east of the current mine area, the OEH continues and has been intersected up to 500 m away from current underground infrastructure. It is, however, less well developed, with grades consistently decreasing in this direction from current mining operations.

Limited exploration drilling to the west of the mining area in combination with underground mapping and drilling results indicate that the western boundary of the mine is defined by the Northern Fault. The Northern Fault is considered to be a thrust plane on which a major westward verging fold containing the OEH had ridden. Rosh Pinah geologists expect that there is little potential to find mineralization west of the Northern Fault, and as such it represents a domain boundary.

At the southern end of the mining area, the lens follows the steep overturned F2 fold plunge of the Rosh Pinah Anticlinorium resulting in a sheet fold closure within the Eastern Orefield.

LOCAL AND PROPERTY GEOLOGY

The base metal sulphides at the Rosh Pinah mine are contained within the approximately 30 m thick ore equivalent horizon (OEH). In the Rosh Pinah mine area, the Rosh Pinah Formation has been shown to be at least 1,250 m thick.

Sequence stratigraphic analyses indicate significant sea level changes and associated prograding and retrograding of the clastic submarine fans hosting the deposit. Deposition of the OEH occurred towards the end of a transgressive phase, but was subsequently eroded in places during a regressive phase (Figures 7-2, 7-3 and 7-4, Mouton, 2006).

MINERALIZATION

Table 7-1 presents a summary of the common mineralization lithologies and descriptions, as applied to core logging and underground mapping, at Rosh Pinah mine.

TABLE 7-1 COMMON MINERALIZATION LITHOLOGY DESCRIPTIONS
Trevali Mining Corporation – Rosh Pinah Mine

Mineralization Lithology	Description / Definition
Argillite	Refers to any shale, mudstone, slate or extremely fine grained clay rich rock of sedimentary origin with particle size <0.05 mm of non-specific metamorphic grade (locally dark grey to black).
Argillite Ore	Any argillitic unit hosting potential of economic grade sulphide mineralization.
Arkose	A feldspar-rich sandstone or grit coarse grained with angular to sub- rounded clasts substantially smaller than 4 mm. No genetic implications are made.
Arkose/Breccia Ore	Any arkosic unit hosting potential of economic grade sulphide mineralization.
Carbonate (X-CO3)	Rock consisting predominately of carbonate minerals such as calcite, dolomite and siderite. No genetic, specific composition or lattice structure is inferred (igneous, sedimentary or hydrothermal).
Carbonate Ore	Any carbonate hosting potential of economic grade sulphide mineralization.
Massive Ore	A rock containing >30% by volume of sulphides.
Micro-Quartzite	Highly silicified, glassy, black or dark grey rock composed predominantly of crystalline silica having a particle size <20 microns. Does not scratch with steel.

Mineralization Lithology	Description / Definition
Microquartzite Ore	Microquartzite hosting potential economic grade sulphide mineralization of interest.
Sugary Quartzite	Quartzite with an equigranular to granular or crystalline texture resembling the appearance of bread.
Sugary Quartzite Ore	Any sugary quartzite unit hosting potential of economic grade sulphide mineralization.

The major mineralization types are described in detail below:

MICROQUARTZITE AND ARGILLITE

The primary mineralization type at the Rosh Pinah mine is a silicified, grey to dark grey, fine-grained and laminated unit locally called microquartzite mineralization. It consists of alternating millimetre to centimetre wide bands of sulphides (sphalerite, pyrite and galena + minor chalcopyrite) and is believed to represent a classic sedimentary-exhalative (SEDEX) style exhalite. The argillite mineralization at the Rosh Pinah mine would be similarly derived, but diluted with background benthonic argillite.

ARKOSE/BRECCIA

The mineralization occurs as breccia matrix and veins in silicified arenite lithologies (locally referred to as breccia mineralization) or as disseminated base-metal sulphides (locally referred to as arkose mineralization) and can reach economic grades. In places, the arkose/breccia mineralization gives indications of primary sulphide exhalations into an arenitic host. The breccia mineralization is commonly found in the immediate footwall to the ore horizon.

CARBONATE

Carbonate mineralization is considered to be purely remobilized and provides the major economic component of the resource. Carbonate has replaced the arenites, both in the hanging wall and footwall of the ore horizon and a continuous range is observed from slightly carbonatic arenite (textures such as large, ghost feldspar grains occur) to pure carbonate, with all original textures lost. The carbonate has scavenged, concentrated, and remobilized base metal sulphides from the primary microquartzite mineralization. A near-total base metal enrichment of the carbonate mineralization gives rise to massive mineralization. When the carbonate has been leached out of the carbonate mineralization and the quartz grains and sulphides remain, the ore is locally referred to as sugary quartz mineralization.

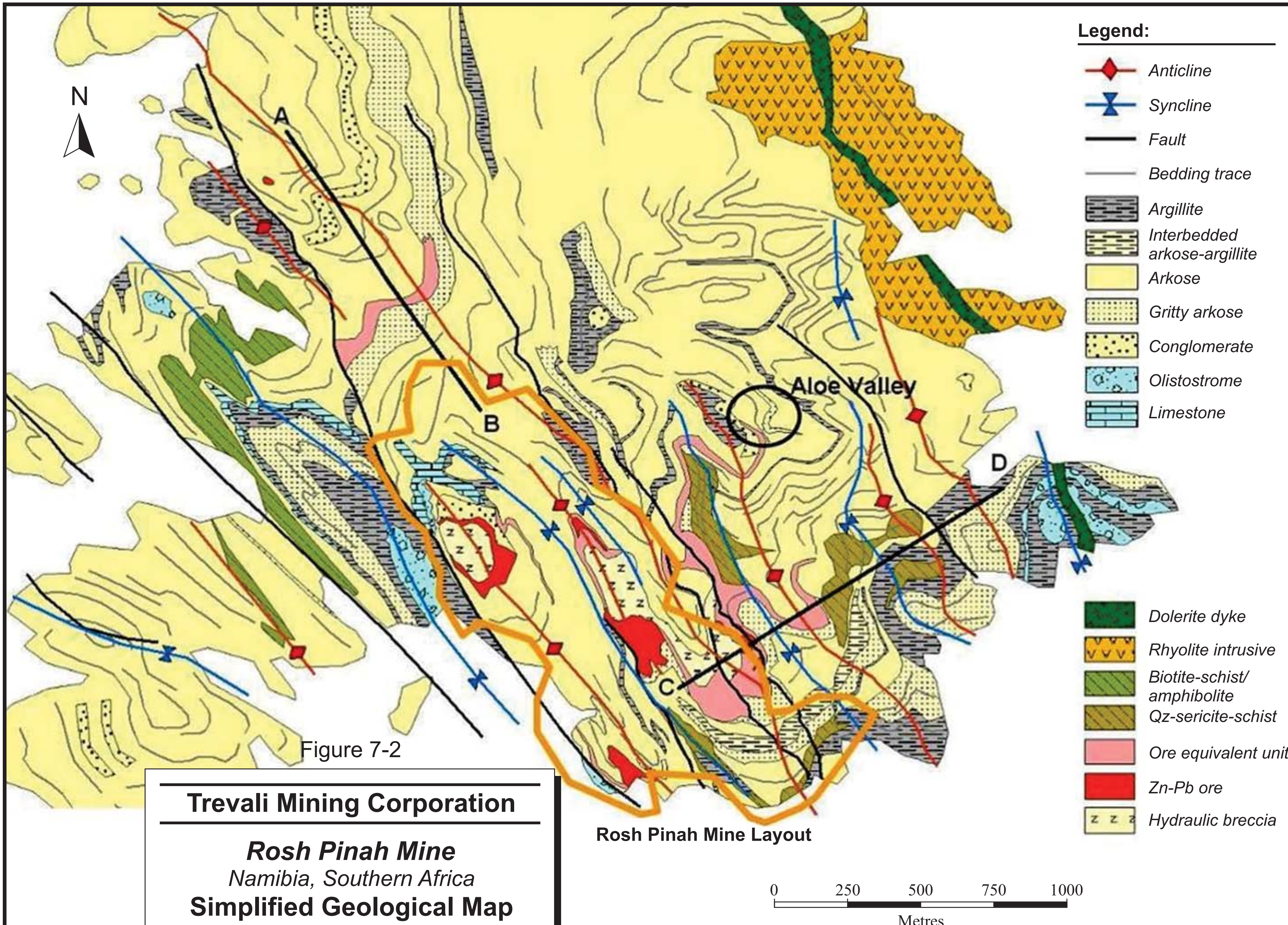


Figure 7-2

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Simplified Geological Map of the Rosh Pinah Area

April 2017

Source: Mouton, 2006.

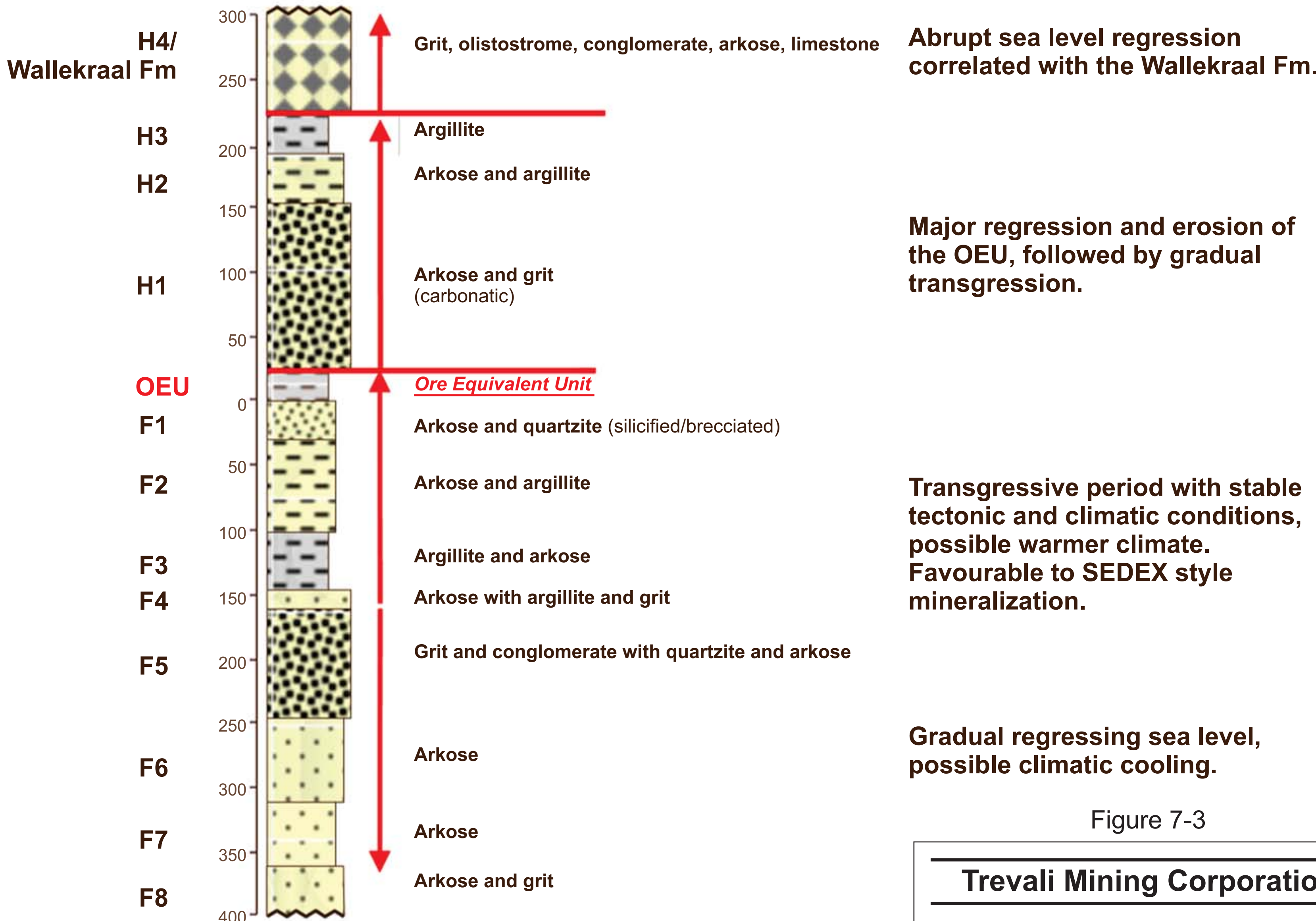


Figure 7-3

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Generalized Stratigraphic Column of the Rosh Pinah Area

April 2017

Source: Mouton, 2006.

RPA

www.rpacan.com

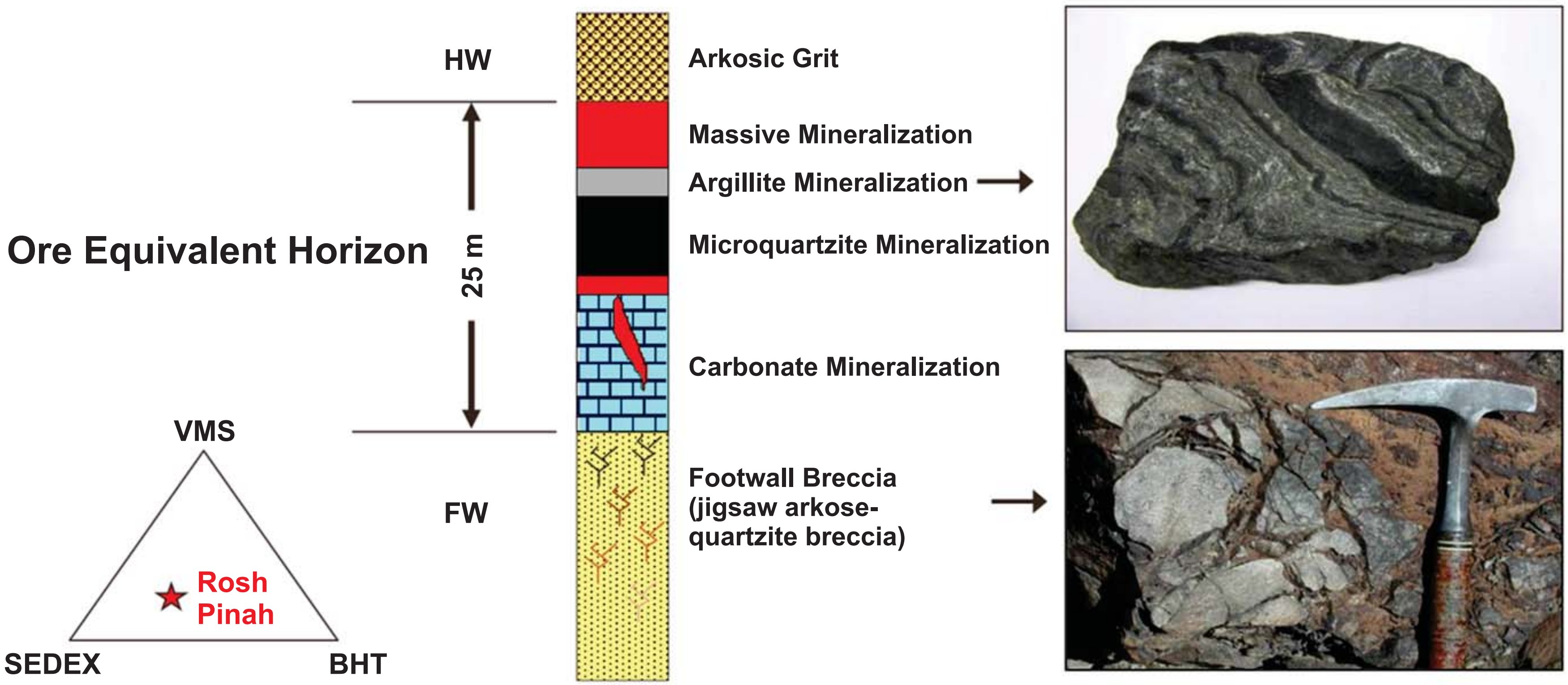


Figure 7-4

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Ore Equivalent Horizon

Source: Rosh Pinah Zinc Corp., 2016.

PRIMARY LENSES

The Rosh Pinah deposit is hosted by a thick package of turbidites comprising hinterland and contemporaneous volcanic clastics deposited in a Neo-Proterozoic rift basin during the early part of the evolution of the Gariep Terrane of southern Namibia.

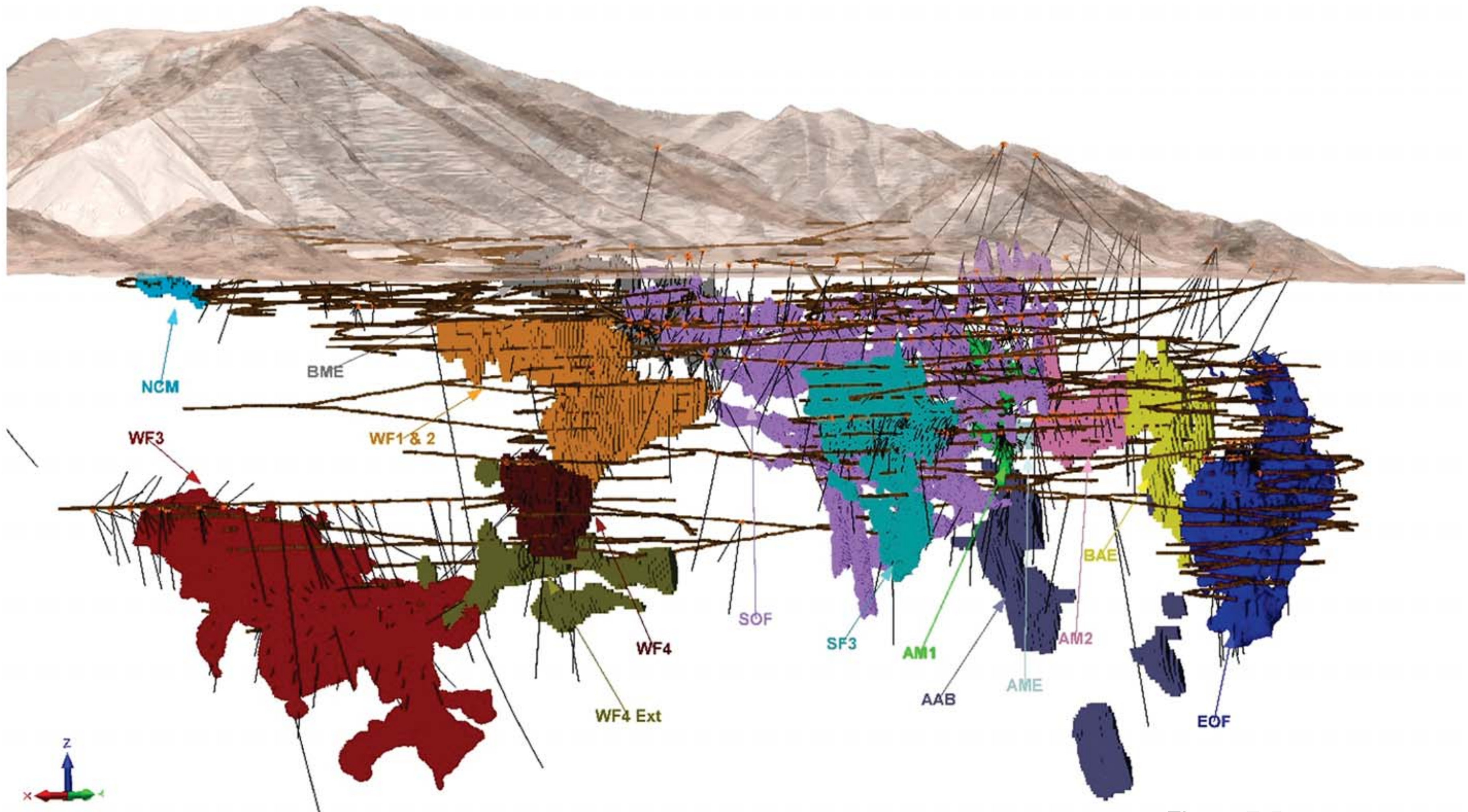
Metals scavenged from a primary (SEDEX type) argillite ore were concentrated by late hydrothermally- driven carbonate alteration, providing a carbonate host to the economic deposit at Rosh Pinah mine. Basin inversion led to oblique continental collision and complex deformation of the deposit, resulting in two phases of disharmonic overfolding with associated faulting and shearing.

The Rosh Pinah deposit is consequently presented as a series of discrete carbonate and exhalite lenses located on second-phase fold hinges or steeply plunging fold limbs connected by a partially attenuated exhalite- dominated ore-equivalent horizon.

The lenses have been separated into Primary, Secondary, and Tertiary classifications dependent upon their current materiality. The Rosh Pinah lens names are listed in Table 7-2 and are illustrated in Figures 7-5 and 7-6.

TABLE 7-2 LENS NAMES
Trevali Mining Corporation – Rosh Pinah Mine

Category	Lens Name	Lens Short Form
Primary	Western Orefield 3	WF3
	Eastern Orefield	EOF
	Southern Orefield 1	SOF1
	Southern Orefield 1 North	S1N
	Southern Orefield 1 South	SIS
	Southern Orefield 3	SF3
Secondary	BAE	BAE
	A MINE 1	AM1



Legend:

Taupe = Surface

Brown Lines = Current Underground Development

Coloured Areas = Defined Orebodies

April 2017

Source: RPA, 2017.

Figure 7-5

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Perspective View of the Rosh Pinah Deposit

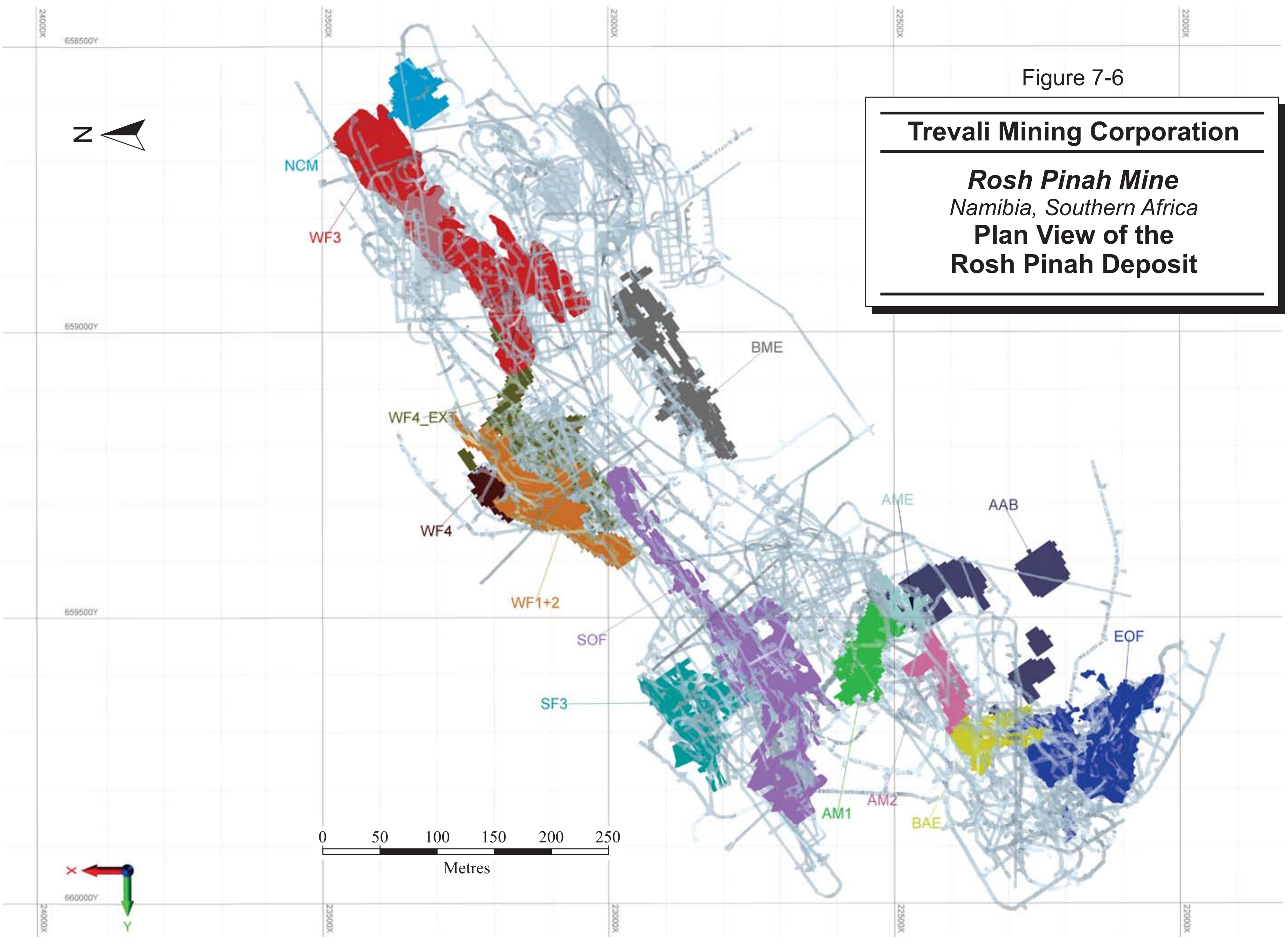
Figure 7-6

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Plan View of the Rosh Pinah Deposit



April 2017

Source: RPA, 2017.

RPA

www.rpacan.com

WESTERN OREFIELD 3

GEOLOGY

The lithology of Western Orefield 3 (WF3) varies along strike. From section +450 to +330, the ore lithology is predominantly microquartzite, grading to a carbonate breccia between sections +330 and +180 and finally to an arkose breccia from section +180 southwards. The Breccia mineralization lithology sections include arkose, microquartzite breccia, arkose breccia, as well as chlorite and biotite-chlorite schist. WF3 is interpreted to occupy a feeder zone consisting of numerous mineralized lenses with mostly secondary sphalerite and pyrite. The lens is cut off to the west by the northwest striking Northern Fault.

On average, WF3 comprises 7% arkose/breccia, 58% carbonate, and 36% microquartzite ore. It is graded from an arkose breccia dominated ore from section +90 to a carbonate dominated ore on section +210. From section +210 to +540, WF3 is almost exclusively composed of microquartzite and carbonate ore. Microquartzite ore becomes more dominant from section +330 further north. The average composition of WF3 from section +90 to +300 is 9% arkose/breccia, 68% carbonate, and 36% microquartzite ore. From +330 to +540 sections, it is made up of 2% arkose/breccia, 43% carbonate, and 55% microquartzite mineralization.

STRUCTURE

The WF3 deposit is interpreted to be a feeder zone consisting of numerous mineralized lenses with mostly secondary sphalerite and pyrite and is confined to the west by the Northern Fault. The mineralized lenses merge into singular lenses in some areas which is interpreted to be due to increased fluid activity.

The WF3 deposit generally dips northeast, striking northwest (325° to 145°) and almost midway through the deposit strike, the dip changes to southwest in the uppermost zones. Underground mapping of lithologies surrounding the orebody has revealed that WF3 is structurally controlled by shears zones and argillite bands. The ore zone contacts appear to be pervasively sheared in places probably due to the structural effects of the Northern Fault. Three faults are modelled and projected in place from the south composed of SF, SF1, and NF Splay striking parallel to the Northern Fault causing chlorotic schist in places. Microquartzites enveloping the ore have slightly undulating, graphitic, slickenside joint planes.

The semi-tabular WF3 deposit has a highly irregular hanging wall dip and direction. Dip of the designed hanging wall varies from relatively flat to steep.

MINERALIZATION

WF3 differs from other recently mined zones of the Rosh Pinah deposit in terms of much greater metal zonation which impact on the recoverability of the different metals. Mineralization zoning in WF3 indicates a central high copper, iron and zinc domain which then gives way to sphalerite and galena domain as it becomes distal to this central zone. Zinc grade above an economic resource grade is present throughout the WF3 area, however, the higher grades encountered are restricted to distinct zones or structural bands.

The lithological characteristics has a large influence on the metal zonation but does not define it; the carbonate zones in WF3 typically present higher grade than that of the microquartzite however further metal domains can be found within the carbonate hosted zones. A small area of the WF3 lens contains high Cu mineralization situated in predominantly carbonate ore and is hosted within the high Zn domain, however within the same carbonate envelope but situated within a separate parallel structural limb is distinct high Pb mineralization (Figure 7-7). Copper grades this high have not been previously encountered in the Rosh Pinah deposit. The carbonate hosting the mainly massive sulphide mineralization, typically ranges in thickness between 5 m and 45 m. The WF3 deposit has been sub-divided into two zones based on grade variations (Figure 7-8).

Zone 1, which extends from +90 to +310 section, is a Zn-Fe-Cu rich and Pb-Ag poor zone. This zone is therefore interpreted to be in closer proximity to the feeder zone. The northern and lower extents of WF3 (Zone 2) become relatively enriched in lead and silver, and depleted in copper and iron, and it can therefore be assumed to be more distal to the source. The two zones' average hardness also differs with Zone 2 material being harder than Zone 1. This is most likely due to an increased ratio of microquartzite hosted ore to carbonate ore. This is important to model as mill crushing and grinding time is increased for Zone 2.

If the Bimodal-Felsic VMS model applies to WF3, then it can be assumed that the Ag content, in the form of tetrahedrite, might significantly increase further to the north. The mineralogical study on WF3 has revealed that the alteration of gangue minerals is extensive in the form of biotization, chloritization, and carbonization.

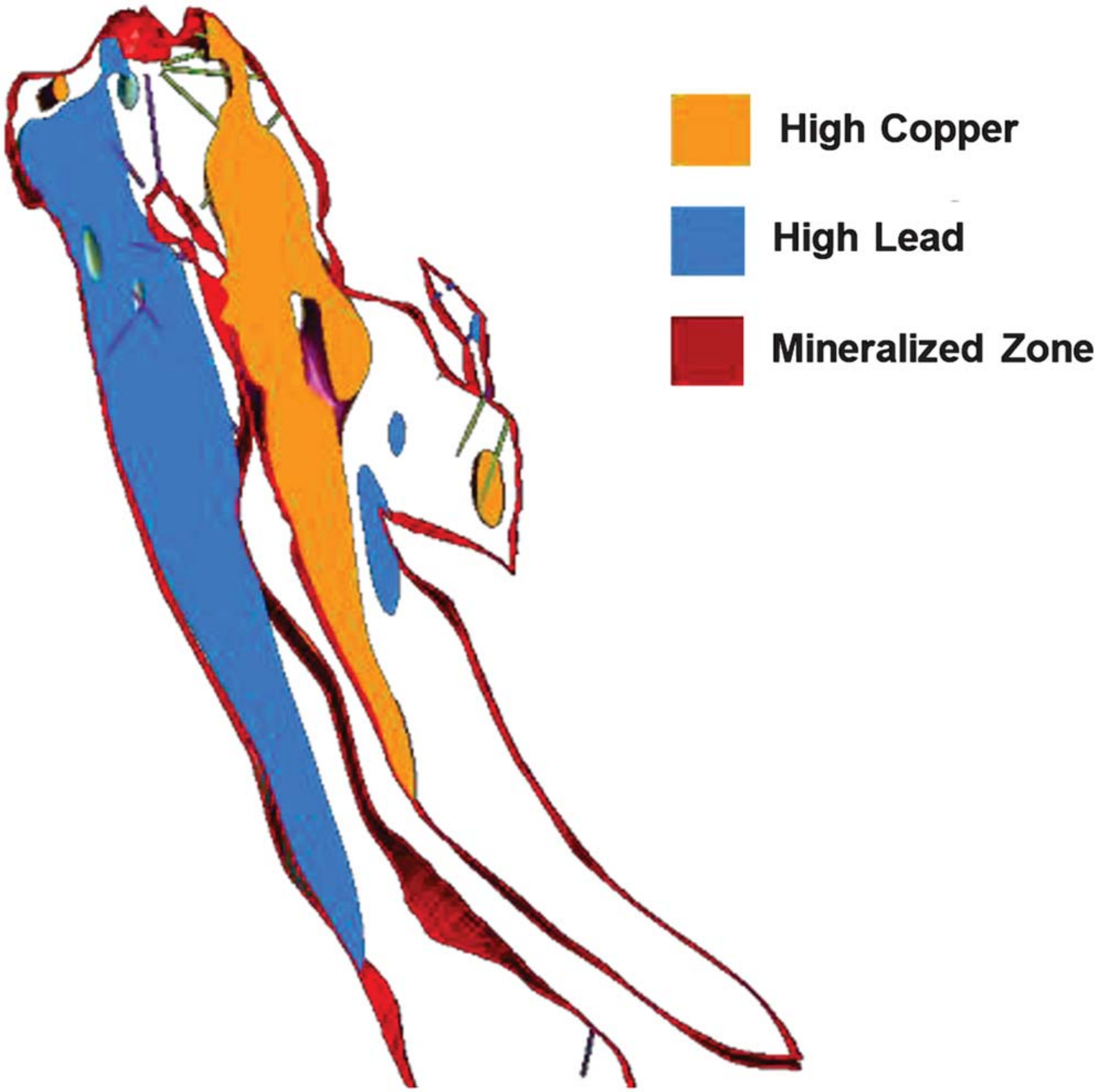


Figure 7-7

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Cross Section Illustrating WF3 Distinct Metal Zonation

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

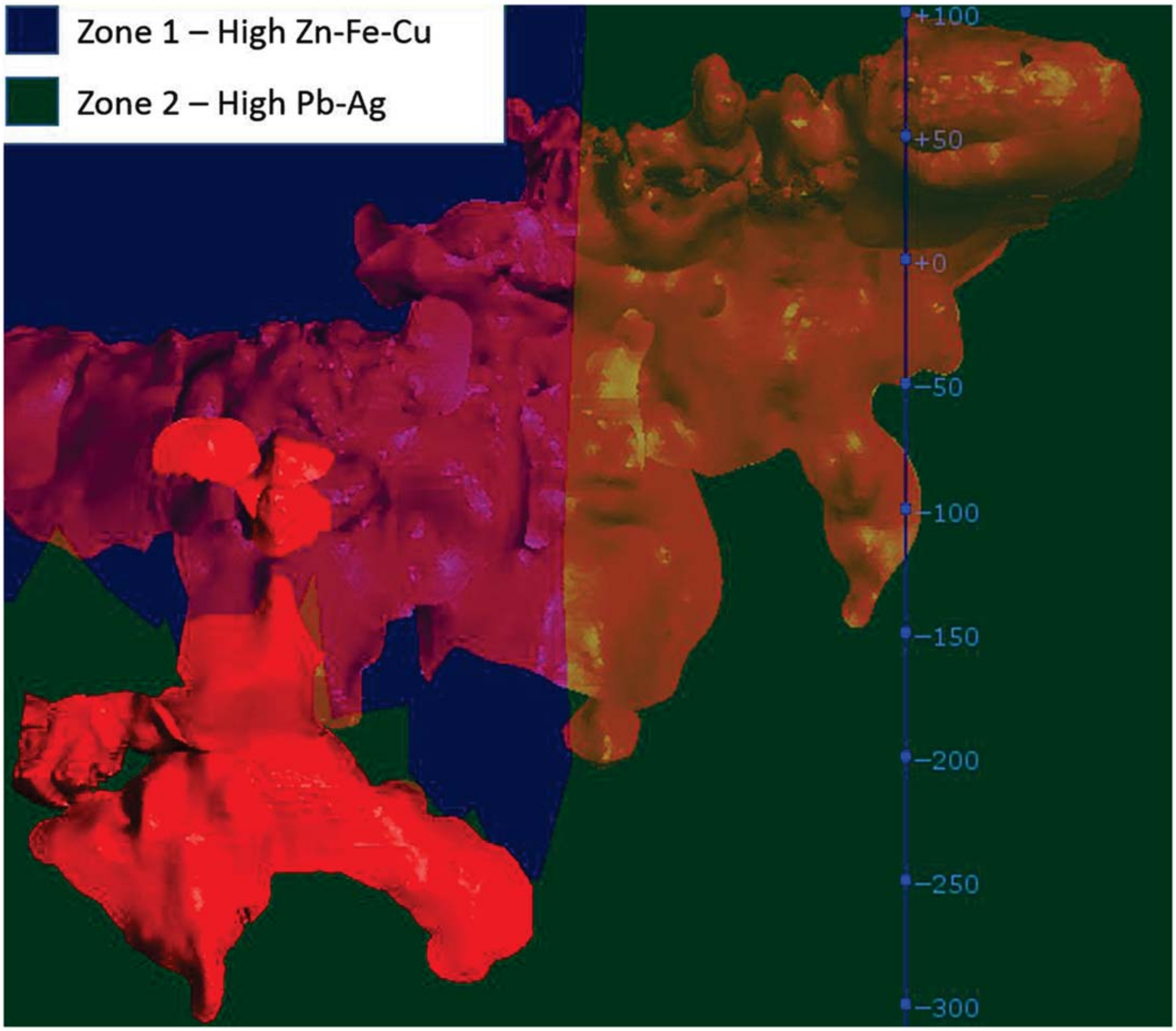


Figure 7-8

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Generalized Mineral Zoning in WF3 with Two Main Zones

April 2017 ***Source: Rosh Pinah Zinc Corp., 2016.***

The sulphide minerals also show a high degree of alteration in the form pyrite overprinting, and are highly and complexly intergrown. Mineral purity analyses have shown that the Fe-content of sphalerite is relatively high, and the Zn-content is relatively low (Table 7-3).

TABLE 7-3 SPHALERITE AND GALENA PURITY FOR WF3, EF1, SF3 AND WF4
Trevali Mining Corporation – Rosh Pinah Mine

Lens	Zn	Fe	Mn	Pb	Zn	Ag
WF3	60.76	5.13	0.19	85.85	0.24	0.41
EF1	65.10	2.08	1.16	79.88	0.47	0.36
SF3	63.04	6.16	0.24	85.28	0.56	0.18
WF4	63.71	3.07	0.26	72.14	0.58	0.53

EASTERN OREFIELD

The Eastern Orefield (EOF) consists of the Eastern Orefield 1 (EF1) lens, which is the western limb of the EOF sheath fold, and EF2 lens, which is the eastern limb (Figure 7-9).

GEOLOGY

Carbonate mineralization constitutes 80% of the EOF. Carbonate mineralization in the Eastern Orefield 2 (EF2) is a complete replacement of the primary microquartzite/argillite mineralization both in the hanging wall and footwall of the ore equivalent horizon. The carbonate mineralization is light grey, fine grained with irregular sugary quartzite zones. The sphalerite-galena- pyrite mineral assemblage is mostly disseminated throughout the carbonate. Chalcopyrite occurs as minor disseminations, while alabandite occurs as coarse grained blebs in places.

Microquartzite mineralization, which accounts for approximately 15% of the mineralization, is pervasively silicified. The microquartzite/argillite mineralization is dark grey, fine grained and laminated. Sulphide mineralization (sphalerite-pyrite-galena +/- chalcopyrite) occurs in millimetric to centimetric bands/laminations. Minor mineralization occurs in fractures perpendicular to the laminae. Massive sulphide mineralization also occurs mostly in the microquartzite ore.

Arkose mineralization constitutes approximately 5% of the mineralization and is mostly remobilized sulphides forming as veins in the breccia or immediate hanging wall.

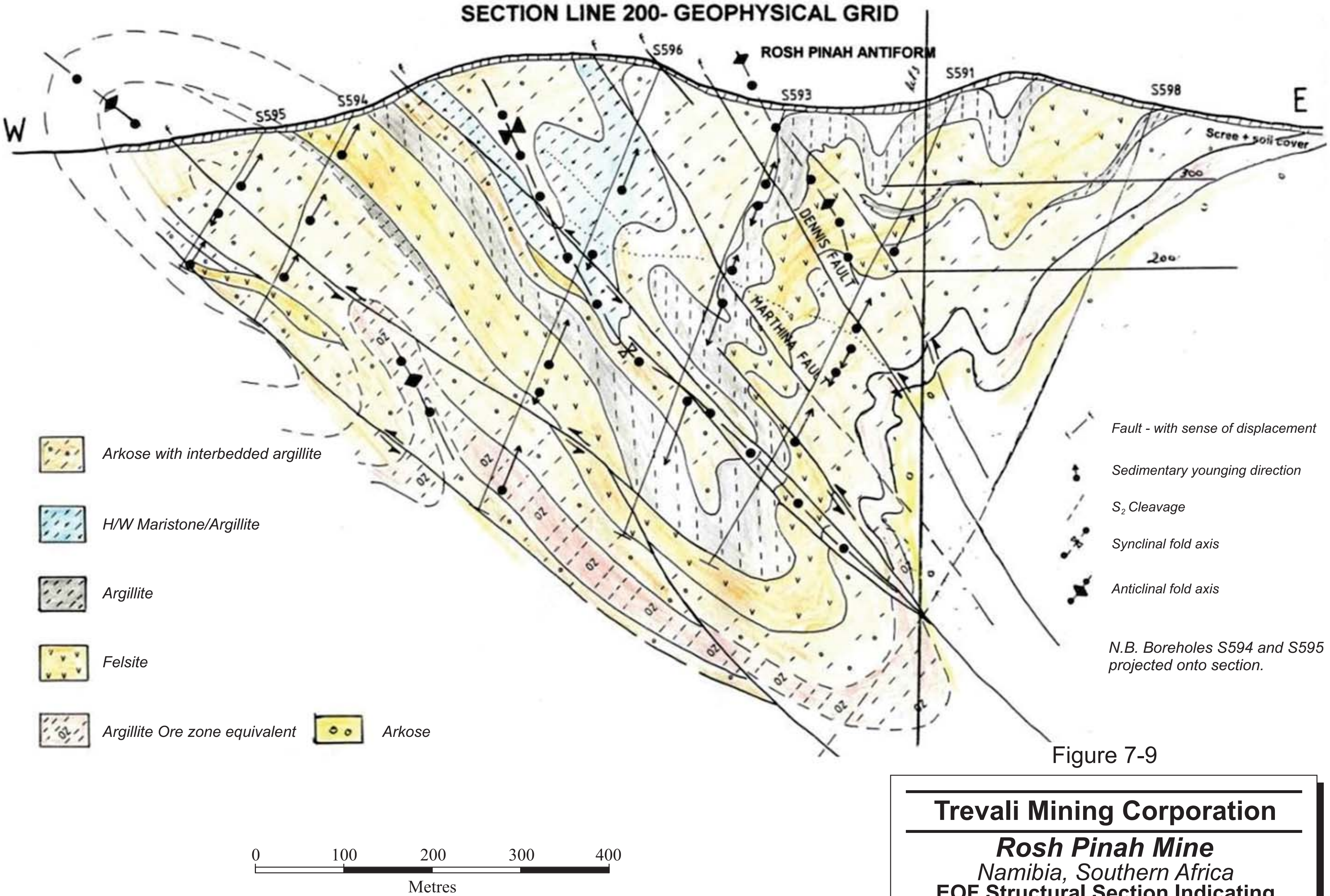


Figure 7-9

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

EOF Structural Section Indicating the Western Syncline and the Eastern Anticline as well as Major Faults Cross Cutting the Orebody

April 2017

Source: Watkeys, 2001.

STRUCTURE

The EOF lens is considered to be situated in a Z-fold, consisting of a western syncline and an eastern anticline, flanked by two steeply dipping sinistral faults, the A-E and the Dennis faults with the central part crosscut by the Martina Fault. D2 deformation in the Rosh Pinah mine area consists of folds with north-northwest to south-southeast orientated axes which plunge in both directions (Watkeys, 2001). Additionally, the D2 folds axial planes are upright to slightly westerly overturned, striking 326° and dipping at 65°. The D3 comprises east-west to southwest to northeast folds.

MINERALIZATION

Zinc occurs almost entirely as the mineral sphalerite and small amount as zincian dolomite, while the lead occurs mainly as galena. Pyrite is the dominant sulphide gangue, with small amount of chalcopyrite occurring as inclusions in sphalerite and as discrete grains. Mineralization varies from a relatively common, coarse grained, massive variety to a less common, disseminated, or laminated.

SOUTHERN OREFIELD 1 – NORTH AND SOUTH (S1N AND S1S)

The Southern Orefield 1 (SOF1) is comprised of Southern Orefield 1 North (S1N) and Southern Orefield 1 South (S1S). The lens lies between sections -180 and -850 on all levels.

GEOLOGY

The SOF1 lens is hosted within a thick arenitic sequence. The main lithologies are microquartzite and argillites, which are moderately to poorly mineralized. Carbonate is minor and in most cases hosts the highest grade mineralization. Microquartzites and argillites are usually well laminated with disseminated pyrite. The hanging wall rocks consist mainly of light grey to dark grey arkoses intercalated with centimetre to decimetre thick argillite horizons, which in places are up to a metre thick. The textures of the arkoses range from fine to coarse grained, consisting of sub-rounded to angular, mainly feldspar and quartz grains in a fine grained matrix. In some places the arkose sequence underwent alteration and is slightly silicified.

The footwall rocks consist mainly of grey to dark grey arkoses, which are slightly silicified in places. The textures vary from fine to very coarse grained. Argillite or microquartzite intercalations are rare and, if present, are only a few centimetres thick. Millimetre to centimetre thick quartz veinlets occur in the arkosic unit.

STRUCTURE

The upper portions of S1N appears to represent a tightly folded anticline as part of the western limb of the Quick Access antiform or a subsidiary fold there on. The S1N is bordered to the west by the SF1 fault and by the A-mine shear to the east. The lower portion has been interpreted as the eastern limb of a synformal structure, cut off by major fault zones to the west and east (SF1 and A-mine shear, respectively).

The S1S is interpreted as a D2 fold (Figure 7-10). The upper portion of the S1S probably represents part of the western limb of the Quick Access Antiform or a subsidiary fold thereon, whereas the lower portion is interpreted as the eastern limb of a synformal structure, cut off by major fault zones to the west and east. The upper portion of the S1S likely represents part of the western limb of the Quick Access Antiform or a subsidiary fold thereon, whereas the lower portion is interpreted as the eastern limb of a synformal structure, cut off by major fault zones to the west and east.

MINERALIZATION

The S1N lens consists of the following mineralization types:

- Dolomite – Dolomite with sphalerite, galena, and pyrite.
- Microquartzite – Quartzite with quartz, muscovite, K-feldspar, pyrite, and sphalerite. Galena is interstitial to the sphalerite
- Massive – Quartzite or dolomite matrix with sphalerite, galena, and pyrite.

The S1S lens consists of the following mineralization types:

- Dolomite – Dolomite with sphalerite, galena, and pyrite.
- Massive – Matrix of dolomite and quartz with sphalerite, galena, chalcopyrite, and pyrite.

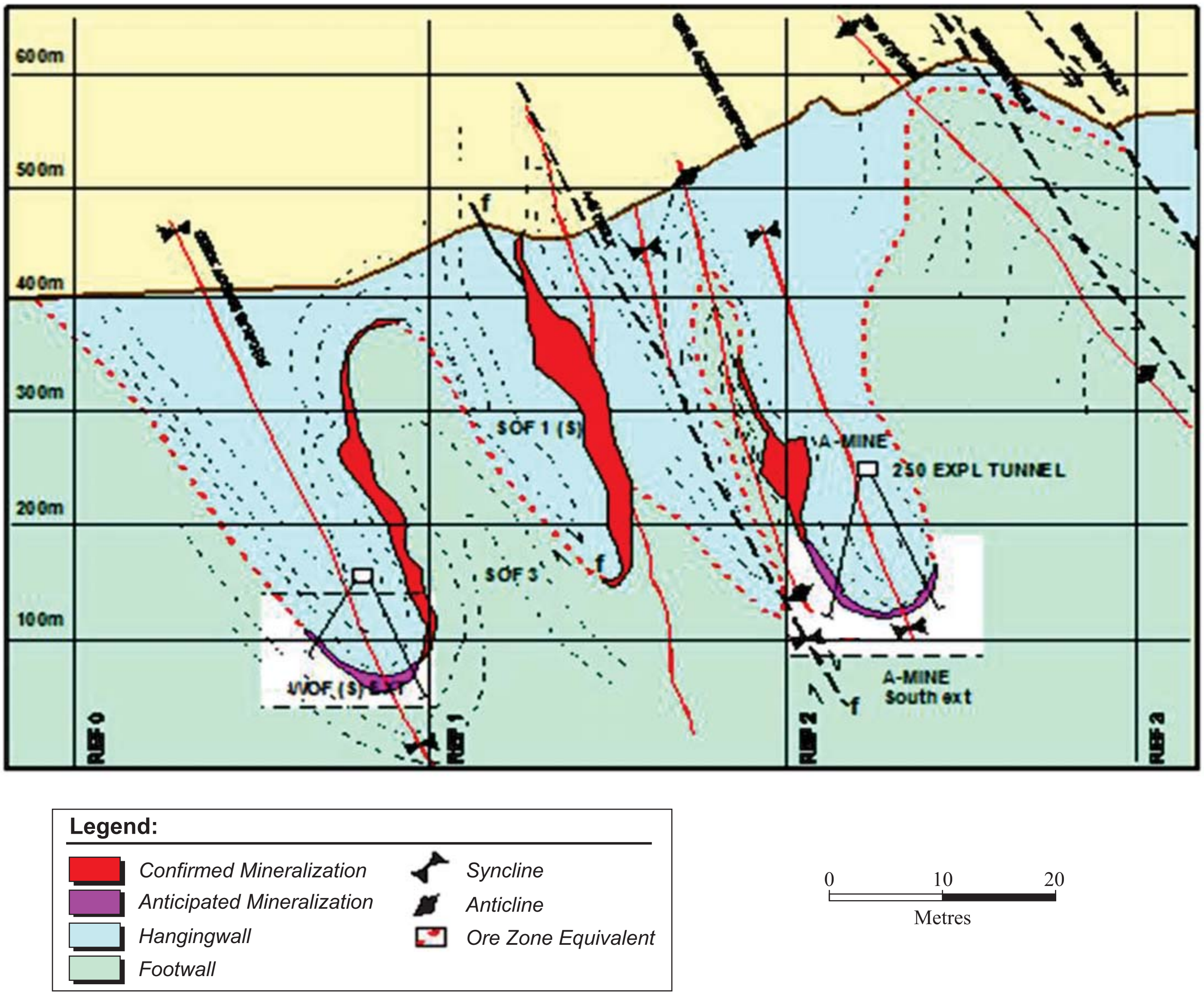


Figure 7-10

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

S1S Orebody Project

Section -660

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

SOUTHERN OREFIELD 3

The Southern Orefield 3 (SF3) lens is located in the southwestern part of the mine. The lens is between -480 to -720 sections and 310 and -050 levels.

GEOLOGY

The SF3 dominant mineralization types are carbonate and arkose/breccia. The carbonate mineralization is found in the upper levels and the ore becomes more arkosic in lower levels. Overall, there are slightly more carbonates than arkoses. There are also minor amounts of argillite mineralization.

STRUCTURE

SF3 is mostly a thin lens with a number of discrete lenses. In the upper parts of SF3 (above 140 level), the lens exists as numerous small lenses of mineralization, all having a similar strike, northwest-southeast, and dip steeply to the east.

In the lower regions (below 140 level) there is only one thicker, more continuous lens. The lower region has a similar strike and dip as the upper regions. The Northern Fault cuts off the mineralization to the west, and the lens pinches off to the north, south, and at depth.

MINERALIZATION

The carbonate mineralization in SF3 is moderately to well mineralized, with semi-massive zones. Throughout the carbonate zone, there are remnants of the argillite/microquartzite protolith. The main minerals are pyrite and sphalerite, with less galena and chalcopyrite.

The arkose mineralization is mostly hydraulic fractured arkose with the sulphides present in the fractures. The sulphides are mostly pyrite and sphalerite, with less galena.

Zinc occurs almost entirely as the mineral sphalerite and mostly in the dolomites. Lead occurs mainly as galena. Pyrite is the main sulphide gangue mineral with small amounts of chalcopyrite. Mineralization varies from coarse grained massive to disseminated and laminated types.

SECONDARY LENS

BAE

The BAE lens is located between EF1 and A Mine 2 (AM2), between sections -870 and -980 (New Geology Main). Primary and secondary drilling was carried out on both the New Geology Main (55º – 245º) and New BAE (30º – 210º) grids. Most of the tertiary drilling was done on the BAE grids. The lens is located within existing infrastructure and hence could be easily mined.

GEOLOGY

Carbonate mineralization is the dominant mineralization type, followed by microquartzite/argillite mineralization and minor arkose mineralization (mostly breccia induced remobilization in the footwall).

Carbonate mineralization constitutes 60% of the mineralization and occurs as pinching out lenses. Carbonate mineralization in the BAE is a complete replacement of the primary microquartzite/argillite ore mainly in the hanging wall of the OEH. The carbonate mineralization is light grey, fine grained with irregular sugary quartzite zones. Sphalerite-galena-pyrite mineral assemblage is mostly disseminated throughout the carbonate. Chalcopyrite occurs as minor disseminations, while alabandite occurs as coarse grained blebs in places.

Constitutes about 30% of the mineralization and represents the primary mineralization type. The microquartzite and argillite mineralization are either interbedded with or grade into each other. The microquartzite mineralization is pervasively silicified and hence competent. The microquartzite/argillite mineralization is dark grey, fine grained and laminated. Sulphide mineralization (sphalerite-pyrite-galena +/- chalcopyrite) occurs in millimetric to centimetric bands/laminations, finely disseminated and/or as massive sulphide (u2079). Coarse grained remobilized sulphide is also common in the microquartzite/argillite mineralization. Secondary remobilization is fracture induced and is commonly at an angle to primary bedding.

Arkose mineralization constitutes about 10% of the mineralization and is mostly remobilized sulphides forming as remobilized, coarse grained and granular veins in the immediate footwall. Hanging wall occurrences are rare.

STRUCTURE

The BAE occurs on the limb of the EF1 anticline, between EF1 and AM2, with a variable dip due to multiple folding. The thickness of the lens also varies down dip due to the folding. Evidence of folding is found in core especially in the microquartzite.

MINERALIZATION

The BAE lens is generally high grade (> 15% Zn) and mineralization is typically semi massive to massive or finely disseminated. Secondary remobilization is common in the siliceous and competent microquartzite and foot-wall arkose.

Typical sulphide assemblage for the BAE lens consists of sphalerite, pyrite, galena, and minor occurrences of chalcopyrite. Alabandite is also abundant in the BAE.

Sphalerite occurs as both brown and honey coloured sphalerite. It is mostly fine-grained and massive or disseminated although in places it is remobilized and granular. Sphalerite also occurs as massive mineralization in the microquartzite ore.

Pyrite and galena occurs as fine grained disseminations or semi massive, although in the microquartzite ore it can occur in fractures as remobilized and coarse grained. Pyrite is dominant in the microquartzite laminae.

Chalcopyrite forms thin veinlets in both carbonate ore and microquartzite and mostly occurs in minor quantities.

Alabandite occurs in association with sphalerite as veinlets or coarse crystal disseminations within the carbonate rich ore.

A MINE 1

The A Mine 1 (AM1) lens is located between sections B +20 to H+20 (Amine Grid) corresponding to -620 to -750 on the New Geology Main Grid.

GEOLOGY

Microquartzite is the dominate mineralization type followed by minor carbonate and arkose mineralization.

Microquartzite predominately occurs as fine to coarse grained, dark gray and in both massive and laminated textures. On section F, drill hole P4718 intersected a shear zone with massive quartz veins. Carbonate and barite rich zones were also intersected in this borehole.

Carbonate lenses occur as grey medium to coarse grained and banded.

Arkosic mineralization occurs as fine grained and granular veins within the micro-quartzite

STRUCTURE

The AM1 lens occurs on the westerly limb of the AM1 anticline, between AME to the east and SOF to the southwest.

MINERALIZATION

Typical sulphide assemblage for the AM1 lens consists of sphalerite honey coloured and brown, pyrite, galena, and minor occurrences of chalcopyrite. Mineralization occurs as finely disseminated, semi massive to massive mineralization, in fractures and in veins.

8 DEPOSIT TYPES

The Rosh Pinah mine is a reworked classic SEDEX type deposit comprising a primary banded sulphide exhalite, part of which was carbonatized with associated remobilization and enrichment of sulphides. The secondary carbonate ore carries the higher, economic, base-metal values.

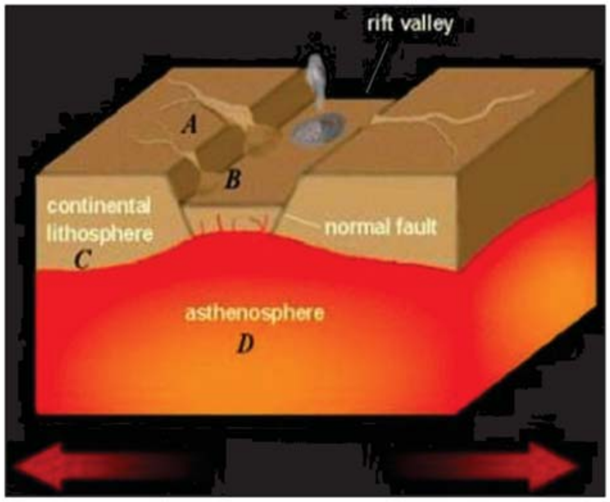
The emplacement of the Spitskop Volcanic Complex and related mafic edifices at approximately 752 Ma to 741 Ma drove hydrothermal plumbing along the rift-fault system of the Rosh Pinah Graben. Hydrothermal fluids leached base metals from the basin-fill siliciclastics which were derived mainly from the erosion of a Palaeoproterozic, 2.0 Ga to 1.7 Ga, calcalkaline island arc in the hinterland (Frimmel et al., 2004).

The base-metal bearing brines were exhaled onto the sea floor from the present-day Western Fault bounding the Rosh Pinah Graben, during a period of sediment paucity and/or high sea-level. Exhalation was accompanied by silicification and hydraulic brecciation of the footwall. The primary ore was deposited at, or below, the sediment/seawater interface as stratiform, interbanded, massive sulphide and cherty argillite (microquartzite). Time between exhalative pulses determined the variation in ratio of content, of chert- exhalite and background argillitic sediment.

At some stage following primary SEDEX style ore deposition, the hydrothermal fluid chemistry changed to carbonitic, either due to introduction of primary volcanogenic carbonate fluids or as the plumbing system tapped carbonate sediments elsewhere in the sedimentary package. Carbonitization of the more porous, arenitic hanging wall and footwall took preference. On-going base-metal exhalation was supplemented by remobilization of primary ore into the hydrothermal carbonate.

Orogenesis at approximately 545 Ma, as a result of transpressive continental collision of the Rio de la Plata and Kalahari cratons, caused complex folding and faulting of the deposit. Fold style is west verging, asymmetric to overturned with steep plunges. Competency interplay caused considerable disharmony within the ductile units of the ore zone, both primary and secondary carbonate being squeezed into fold hinges.

Continental Rifting



Rosh Pinah Rift Graben

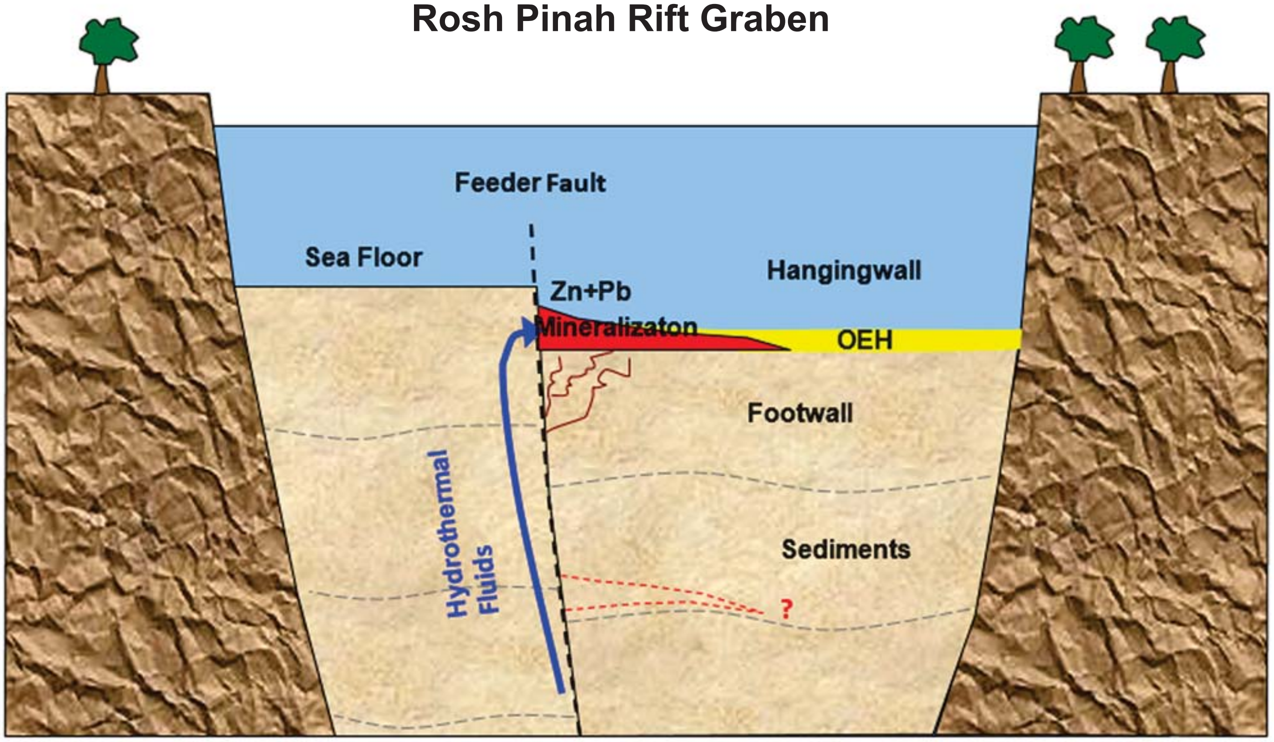


Figure 8-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Rosh Pinah Deposit Model

April 2017

Source: Ezilon.com website, 2017.

9 EXPLORATION

Since the discovery of the Rosh Pinah mine, continued in-mine exploration has played a significant role in extending the life of the mine. The discovery of the WF3 zone has extended the official LOM and further deep-seated mineralization has potential to increase the life of operations far beyond the official LOM.

Recent focus of the regional exploration program was on the Gergarub project, of which RPZC holds a direct 49% interest with Glencore owning an effective interest of 39%. The Gergarub project is located 13 km north of Rosh Pinah where economic concentrations of base metal mineralization were drilled out in joint venture with Skorpion Zinc. Other targets on the exploration licence are also being investigated.

EXPLORATION PROCESS AND TECHNIQUES

Exploration targets at the Rosh Pinah mine are generated and upgraded using the “Stacked Exploration Process” guidelines and definitions, as shown in Figure 9-1.

Regional exploration targets are generated using geophysical methods (satellite imagery and airborne DigHEM and Magnetics), followed up by geochemistry (Mobile Metal Ion (MMI) geochemistry, soil sampling and rock chip sampling) and detailed lithological and structural geological mapping on a 1:1000 scale using global positioning systems (GPS). Positive targets are followed up by a grid-based time-domain electromagnetic (TDEM) survey and/or reverse air blast (RAB) or diamond drilling.

Geochemical signatures are determined by XRF36 analytical method on grab or core samples or by inductively coupled plasma (ICP) multi-element analysis on mineralized core samples. Downhole TDEM on selected PVC-cased boreholes determines the physical characteristics, such as conductivity and alteration that might indicate mineralization.

All targets (regional or underground) classified as speculative and/or higher are diamond drilled. In the Target Phase, RAB and reverse circulation (RC) drilling are used on soil covered plains to determine bedrock lithology and obtain rock chip samples. Alternatively, MMI geochemical techniques are also investigated to locate anomalies within soil-covered valleys.

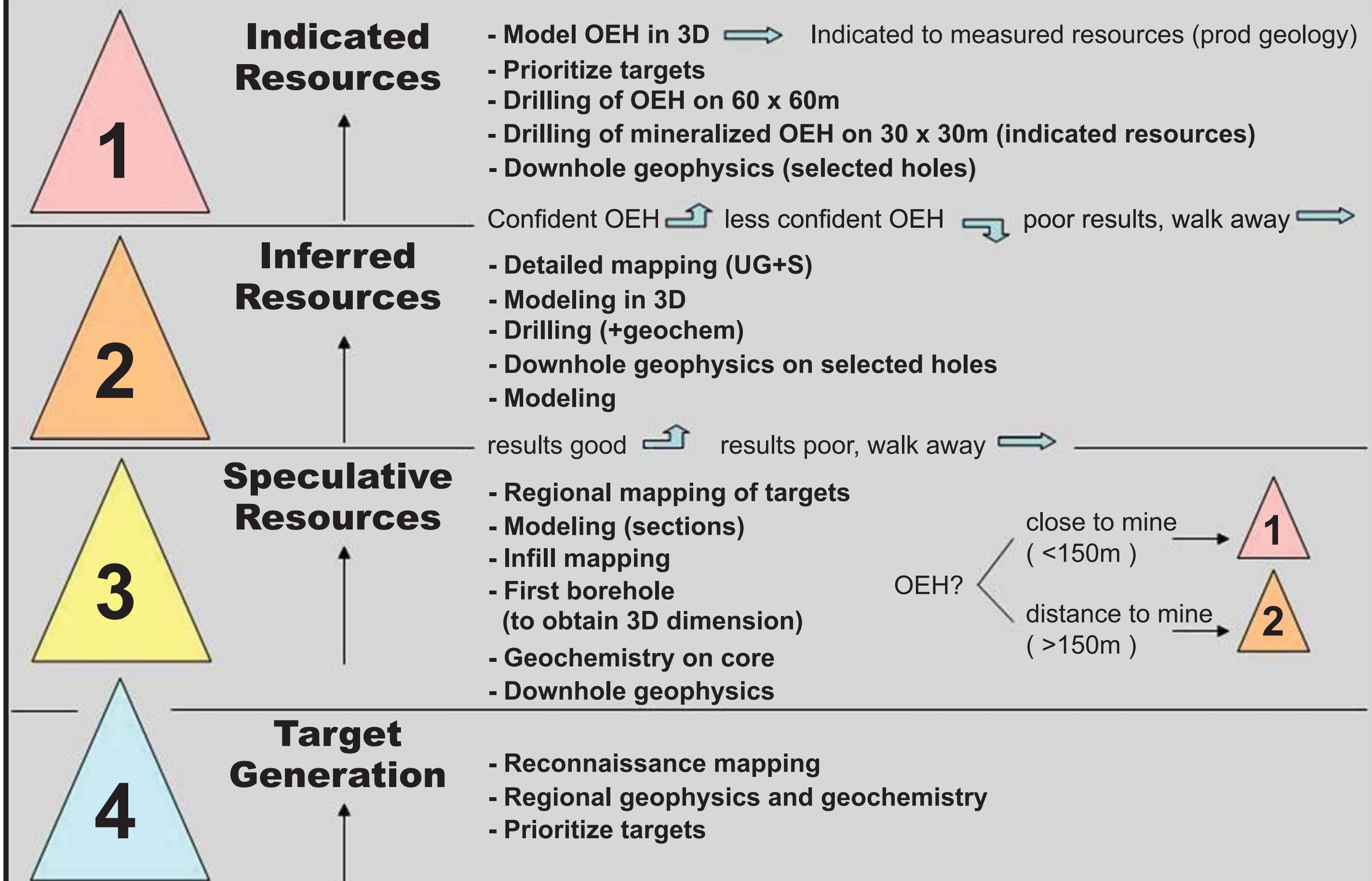


Figure 9-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Rosh Pinah Staked Exploration Process Chart

April 2017

Source: Rosh Pinah Zinc Corp., 2017.

Underground mapping of development areas is conducted by the production and exploration geologists as per standard procedures.

All geological information (surface and underground maps, core logs, geotechnical logs, etc.) are captured and processed using Minesight software and Leapfrog Geo software, from which a regional-scale three-dimensional model of the geology is built. Grade and lithology models are also built for individual targets using standard geological modelling procedures.

Due to the complex structure (multiple folding and faulting) at the Rosh Pinah mine, the guiding philosophy in underground target generation is "moving from the known to the unknown". Thus, underground target generation is based on detailed lithological and structural geological mapping of underground tunnels (on 1: 250 and 1: 500 scales), correct stratigraphic interpretation, and the spatial location of known mineralization or orebodies.

EXPLORATION POTENTIAL

In RPA's opinion, there is good potential for delineating additional Mineral Resources adjacent to current mining areas and within EPL 2616 (see Figure 4-4).

EXPLORATION POTENTIAL ADJACENT TO CURRENT MINING AREAS

Approximately one kilometre of prospective ground is located, at depth, in the northern section of the mining licences north of the WF3 Zone. RPZC is considering drilling underground exploration holes along strike to search for potential intersections at depth and along strike.

Exploration targets have been outlined for northern and lower extensions of WF3 as well as for the AAB lens, which is located directly below the mined Southern lens. Geological interpretation utilizing OEH lithology, structures, grades, and existing knowledge of Rosh Pinah geology, has been used to outline an exploration target for WF3 of 10 Mt to 20 Mt grading 6% to 10% Zn, as well as an exploration target for AAB of 0.5 Mt to 1.0 Mt grading 5% to 8% Zn.

The potential quantity and grade is conceptual in nature, and there has been insufficient exploration to define a Mineral Resource, as well, it is uncertain if further exploration will result in the target being delineated as a Mineral Resource.

Figure 9-2 presents an illustration of the exploration potential adjacent to current mining areas.

REMNANT AND PILLAR INVENTORY EXPLORATION TARGETS

RPZC maintains an inventory of remnants and pillars that have been removed from the reported Mineral Resources after consideration of prospects for eventual economic extraction (Table 9-1). In RPA's opinion, these areas present good potential for conversion to Mineral Resources based on further study or rise in commodity prices.

Previous exploration has been used to outline an exploration target of 3 Mt to 6 Mt grading 4% Zn to 8% Zn. The potential tonnages and grades are conceptual in nature and are based on previous drill results that defined the approximate length, thickness, depth, and grade of these. There has been insufficient exploration to define a Mineral Resource and that it is uncertain if further exploration will result in the target being delineated as a Mineral Resource.

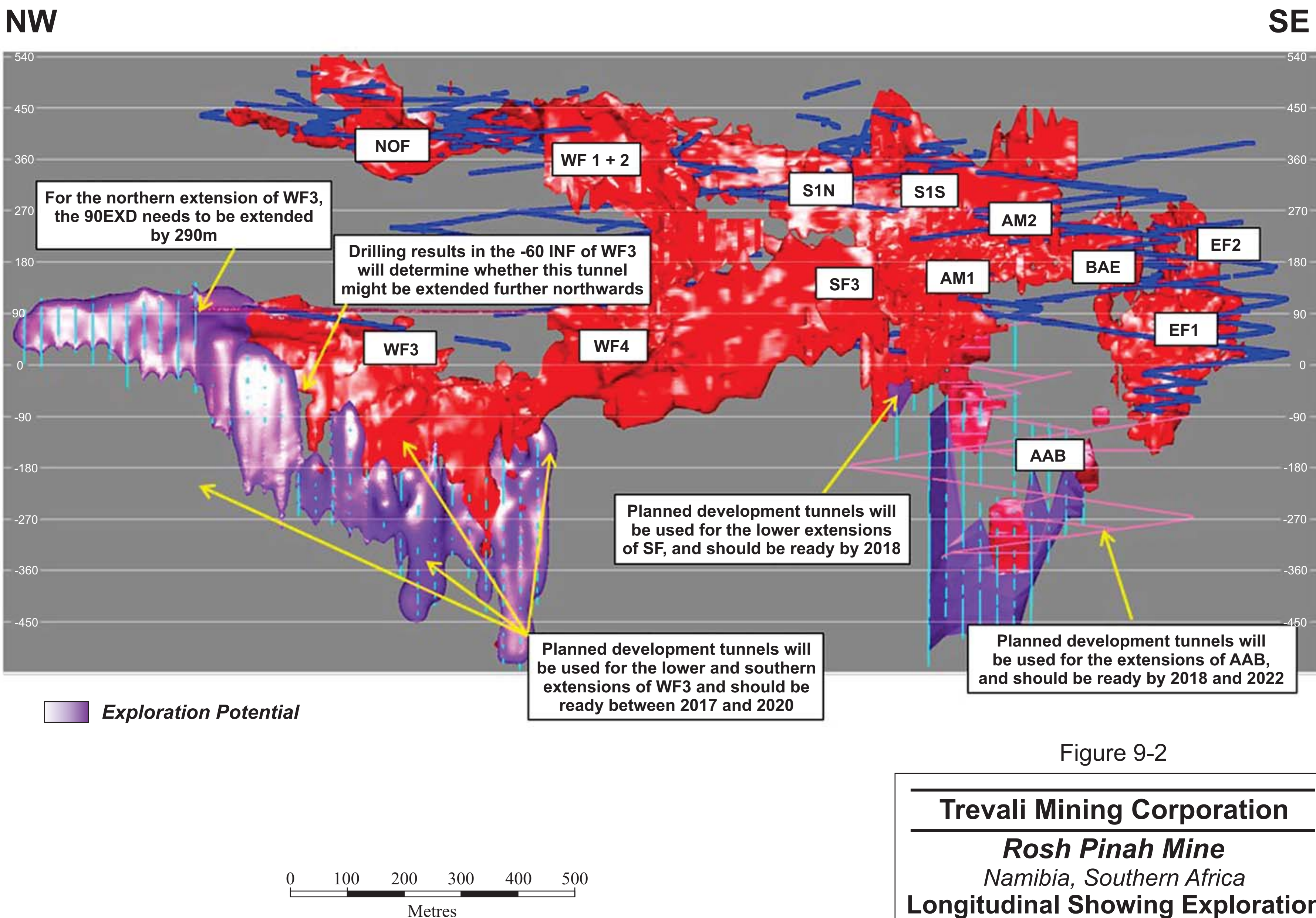


Figure 9-2

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Longitudinal Showing Exploration Potential Adjacent to Current Mining Areas

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

TABLE 9-1 ROSH PINAH REMNANT AND PILLAR EXPLORATION TARGETS
Trevali Mining Corporation – Rosh Pinah Mine

Lens and Location	Comment
A. Mine No. 1: >180 L: B+20 to H+20 and -590 to -750	Slivers
A. Mine No. 2: 230 - 330 L: -730 to -870	Crown pillar and extrusion
A. Mine No. 2: 155 - 230 L: -730 to -870	Slivers
AME> 150 L: -590 to -720	Slivers above 150L
AMI > 380 L: -480 to -630	Slivers
BAE> 200 L: BAE-60 to BAE+70 & MGG: -860 to -980	Slivers
BME > 400 L: -270 to -60	Small lenses modelled around the stope
BME: 360 - 400 L: -270 to -60	Slivers
BQU: All Levels	Slivers
EF1 > 30 L: -930 to -1150	Slivers
EF1- 30 L: - D Block	Pillar
EF1: - 30 L: - B Block	Pillar
EF2: 240 - 290 L	Slivers
NOF1: All Levels: -240 to 420	Slivers around mined out areas
NCM: >425 L: +520 to +630	Slivers
N2X: >390 L: +330 to +495	Slivers
S1N: 225 - 245 L	Pillar
S1N: 200 - 340 L: -180 to -580	Pillar
S1N: 180 - 200 L:	Pillar
S1N: 130 L:	Pillar
S1N: > 340 L: -180 to -580	Slivers
S1S: 225 - 250 L: -580 to -850	Pillar
S1S: 160 - 180 L: -580 to -850	Pillar
S1S: >250 L: -580 to -850	Slivers
SF3: >190 L: -470 to -720	Slivers
SF3: >140 - 190 L: -470 to -720	Slivers
WF1: >255 L: 90 to -300	Slivers
WF2: 100 - 256 L:90 to -300	Slivers
WF4: >30 L: -30 to -150	Slivers
NOF No. 1: R&P South, East, West and North of Blocked out area (Sections +105 to +240, all levels)	Pillars plus Remnants
NOF No. 1: R&P Pillars plus Remnant of blocked out R&P (Sections +105 to +240, all levels)	Pillars plus Remnants
NOF No. 2: O/S S, E, W, N and below of Blocked out area (Sections +210 to +330)	Slivers
B. Mine: R&P North of Block 7	Slivers
C-Mine: Pillar Remnant	Pillar
C-Mine: Remnants around Mined Stopes	Slivers
B. Mine South: O/S West of Open Stope and Sections -1,25 to 1,0)	Slivers
B. Mine West: R&P Pillars	Pillars plus Remnants
B. Mine West: R&P East, West, North, South and below R&P area	Pillars plus Remnants
MOB: O/S Section 1 to 15: All levels	Slivers
A. Mine No. 1: Section B+20 to H+20 (-620 to -750) & 150 -180 Levels	Crown pillar to allow waste tipping
A. Mine No. 2: <140 L: -730 to -870	Slivers
AMI < 380 L: -480 to -630	Oxide component (mineralization more than 10% oxidized)
BAE 150 - 200 L: BAE-60 to BAE+70 & MGG: -860 to -980	Slivers
WF5 50 - 150 L: -240 to -390	Footwall mineralization discontinuous
S1N300 - 380 L: -180 to -580	Slivers
S1N<150 L: -350 to -580	Slivers

EXPLORATION POTENTIAL WITHIN EPL 2616

EPL 2616, which surrounds Rosh Pinah ML 39 and extends approximately 15 km northwest to just past the Skorpion Zinc mine, is up for renewal in November 2017.

An exploration plan is being developed that will ensure retention of EPL 2616 after November 2017. RPZC are reviewing the possibility of a licence wide seismic survey to delineate the prospective geology within the main enclosing structures. Prospective exploration targets can then be generated to satisfy government licence requests and licence areas identified as non-prospective can be returned to the government.

GERGARUB PROJECT

Glencore owns an effective 39% interest in the Gergarub Project. There is no publicly available information on the Gergarub Project as Skorpion, the operator, is a private company.

10 DRILLING

All targets (regional or underground) classified as speculative or higher are diamond drilled.

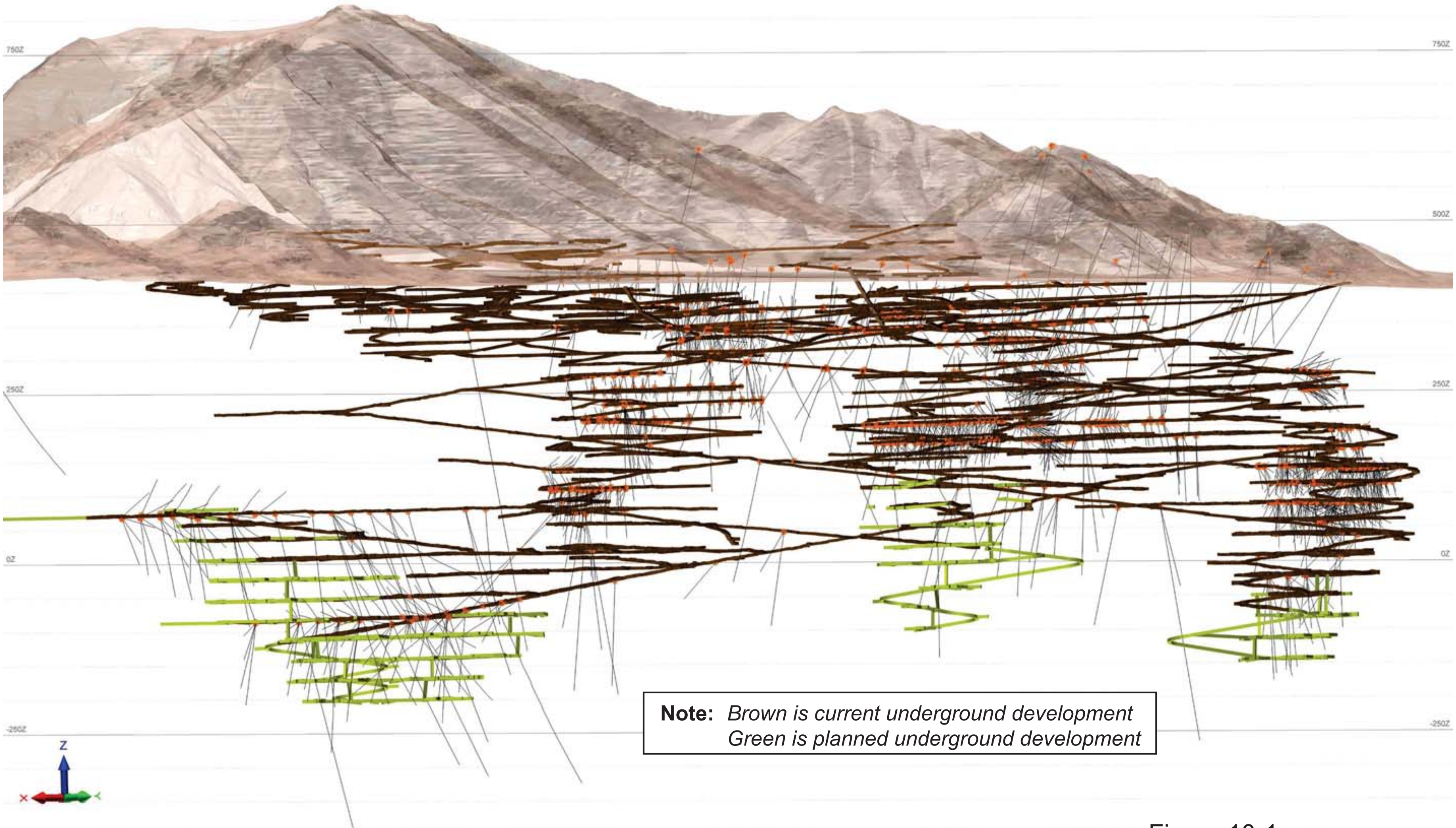
Regional exploration boreholes (surface boreholes) are drilled using HQ sized core for overburden and weathered zones and NQ sized core in fresh rock, while underground boreholes are drilled at BQ sized core. Core recovery at Rosh Pinah is generally above 95%.

The Rosh Pinah drill hole database (Table 10-1) contains 6,815 holes, totalling 513,329.89 m, of surface and underground diamond core drilling (DDH). Figure 10-1 presents a schematic vertical cross section of the Rosh Pinah deposit illustrating drill traces.

TABLE 10-1 DRILL HOLE DATABASE
Trevali Mining Corporation – Rosh Pinah Mine

Type	Code	No. of Holes	Metres
Underground	UG	2,254	302,859.95
Production	PROD	4,355	165,446.93
Exploration	EXPL	184	44,339.45
Geotechnical	GEOTECH	19	545.56
Quality Assurance / Quality Control	QAQC	3	138.00
Total		**6,815**	**513,329.89**

In RPA's opinion, the drilling procedures employed by Rosh Pinah conform to industry best practice and the resultant drilling pattern is sufficient to interpret the geometry and the boundaries of the mineralization. All drilling sampling was conducted under the direct supervision of appropriately qualified geologists. There are no drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the results.



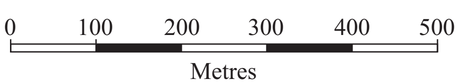


Figure 10-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

3D View of Rosh Pinah Diamond Drilling

April 2017

Source: RPA, 2017.

www.rpacan.com

SURVEY GRIDS

Previously, most drill planning (regional and underground) was constrained to sections on various grids (with the majority on the Main Geology Grid (MGG) - 235º to 055º local). In recent programs, all primary exploration drill planning aims to intersect targets perpendicular to strike and, with the structural complexity, is not constrained to any particular grid. Thereafter, a localized grid is designed based on the primary drill information, on which all secondary and tertiary drilling is based. In most cases, because of the regional mineralization geometry, the MGG is sufficient to account for local structures, e.g., folds, faults etc., and drill hole intersections, and mine workings (current or historical).

DRILL PLANNING AND SITE PREPARATION

Drill holes are planned in MineSight software. A formal procedure exists for the validation of final drill hole collar coordinates, dip, azimuth, and planned depth.

Drill planning (regional and underground) for speculative targets is based on the regional three dimensional model, while planning for Inferred Mineral Resources or higher level of confidence targets is based on the individual target models. Individual target models are more detailed and take into account hard-copy section drafting.

Underground drill planning is classified as primary drilling (drilling on 60 m by 60 m hole spacing), secondary drilling (drilling on 30 m x 30 m hole spacing), and tertiary drilling (drilling on 10 m by 10 m hole spacing – which has recently been revised to 12.5 m by 12.5 m).

Secondary drilling is a follow up on mineralization intersected during primary drilling, and these two phases can run concurrently. Tertiary drill planning, which is designed to upgrade indicated resources to measured resources, is based on three dimensional lithological and grade models and underground development.

COLLAR SURVEYS

Drill locations for underground drill holes are marked by the Rosh Pinah mine Survey Department. Surveyors mark the grid lines and azimuth on the tunnel walls. Drillers are given drill instruction sheets showing the section lines, the direction of drilling, and the dip of the borehole. The drill foreman and geologist check the machine set-up before drilling starts.

DOWNHOLE SURVEYING

All regional and underground exploration drill holes deeper than 100 m are downhole surveyed with a Reflex tool, or historically by the Electronic Multi Shot (EMS), Sperry Sun, or Eastman instruments. Upon completion of every underground drill hole, an instruction sheet is issued to the Survey Department, to survey the final collar position of the drill hole and the dip at the collar. The final depths of all boreholes are verified by reconciling the final depths with the recovered core and the driller's daily log sheet where the final 'stick-up' is recorded. All drill hole survey information is verified and incorporated into MineSight software via the geological data management software acQuire.

GEOLOGICAL LOGGING

Drill core is logged on surface (Figure 10-2) by a geologist for lithological, structural, and geotechnical (core recovery, rock quality designation (RQD), and rock mass rating) information. All borehole information is captured in an acQuire database. The database, which has set validation specifications with data population and validations, is supervised by a Database Manager.

While logging the raw geological data, the geologist assigns an ore deposit litho-stratigraphic zone to each of the logged lithologies. This method of zonation is generally referred to as Lithcodes and is based on the occurrence of the lithology relative to the ore horizon. The zonation has three major units:

- Hanging Wall (HW) – Stratigraphically above the interpreted ore horizon based on sections, plans, younging, etc.
- Ore Zone (OZ) – Mineralized OEH.
- Footwall (FW) – Stratigraphically below the interpreted ore horizon based on sections, plans, younging, etc.

FIGURE 10-2 ROSH PINAH DRILL CORE LOGGING AREA

Additional divisions in each zone are based on the lithological description of the specific unit as shown in Table 10-2.

TABLE 10-2 LITHOSTRATIGRAPHIC ZONES
Trevali Mining Corporation – Rosh Pinah Mine

Lithcode	Key	Lithcode	Key
1	Fault (Brittle)	40	Ore Zone Arkose/Quartzite
2	Shear Zone	50	Ore Zone Massive Ore
3	Quartz Calcite Vein	60	Ore Zone Sugary Quartz
4	Cavity	70	Ore Zone Carbonate
11	HW Conglomerate	71	Ore Zone Carbonate Leached
12	HW Argillite	72	Ore Zone Carbonate Silicified
13	HW Microquartzite	80	Ore Zone Breccia
14	HW Basic Schist	90	FW Arkose/Quartzite
17	HW Carbonate	92	FW Argillite
18	HW Breccia	93	FW Microquartzite
19	HW Felsite/Tuff	97	FW Carbonate
20	Ore Zone Argillite	98	FW Breccia
30	Ore Zone Microquartzite	99	FW Felsite/Tuff

A standardized logging form ensures consistencies in logging among the geologists and ad hoc validations are done by the resident geologist as part of the implemented Quality Assurance/Quality Control (QA/QC) system. The descriptions in all the fields are regularly reviewed and new information is added when appropriate. To ensure consistent geological interpretation, all lithological units, alteration, and mineralization assemblages are described in detail in the "Geological Work Procedures and Standards" documentation.

The borehole sign-off system also ensures consistency of the geological interpretation in the assigning of litho-stratigraphic zones (Lithcodes) and creates a sound document trail.

All primary and secondary drill cores are photographed before the core is stored at the core shed. Since full core samples are taken in all tertiary drilling (to be sent to the laboratory), the tertiary drill core (or the waste part remaining after sampling) is discarded on the waste dumps and not stored in the core shed.

GEOTECHNICAL LOGGING

Geotechnical logging of drill holes is performed simultaneously with geological logging and information is captured in the acQuire database software.

The rock mass classification systems used at Rosh Pinah mine include:

- RMR – Bieniawski
- Q System – Barton
- MRMR – Laubscher

SAMPLING

The site geologist oversees the sampling procedure and ensures that the density of core is measured before samples are submitted to the laboratory. The geologist also ensures that the QA/QC process is followed during sample submission and evaluates the analytical results accordingly.

Sampling standards used when sampling mineralized intersections (sphalerite, galena, and chalcopyrite) include:

- Maximum sampling length of 150 cm.
- A minimum sampling length of 40 cm.
- No sampling across lithological boundaries.
- No sampling across different alteration zones.
- No sampling across different mineralogical assemblages.
- All included waste is sampled.
- 1.5 m of waste is sampled on either side of the mineralized interval.

Sampling intervals are clearly marked on the core. Samples are generated from intervals of the core that intersect mineralization, either automatically or manually in acQuire. Primary and secondary drill core are cut in half using a specialized core saw utilizing fresh water. One half is stored with the rest of the core and the other half is sent to the laboratory for analysis. Tertiary/production drill core is wholly sampled.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

Figure 11-1 presents a schematic flow chart of the RPZC sample preparation, analysis, and QA/QC processes as described below.

SAMPLE PREPARATION AND ANALYSIS

SAMPLE PREPARATION

Samples are packaged at the core shed and registered into the Laboratory Information Management System (LIMS) by assistants in the Mineral Resource Management Department, then dispatched daily to the Rosh Pinah mine Laboratory (RPML) located on the mine site.

On arrival, samples are checked, sorted, bar coded, and activated in LIMS. They are then crushed using a jaw crusher to -5.5 mm before splitting, using a Jones riffler, to obtain a representative sample (approximately 100 g). Samples are then mill pulverized prior to wet chemical preparation.

RPA toured the facility and noted that drill core resource, grade control, and plant samples are all prepared in the same location.

ANALYSIS

The following elements are analyzed at the RPML: Zn, Pb, Mg, Mn, Cu, and Fe by inductively coupled plasma (ICP) and Ag by atomic absorption (AA).

Since the internal RPML is not internationally certified, RPA recommends that a consistent review of external check assaying for geology samples be implemented. Currently 15% are sent out to an independent accredited facility, however, no QA/QC review has been completed within the last two years. RPA also recommends investigating the possibility of analyzing gold assays at the Rosh Pinah mine laboratory using ICP or X-ray fluorescence (XRF) techniques to determine whether fire assay gold assays are required. The inclusion of gold assays in the Mineral Resource estimates may provide an additional NSR value.

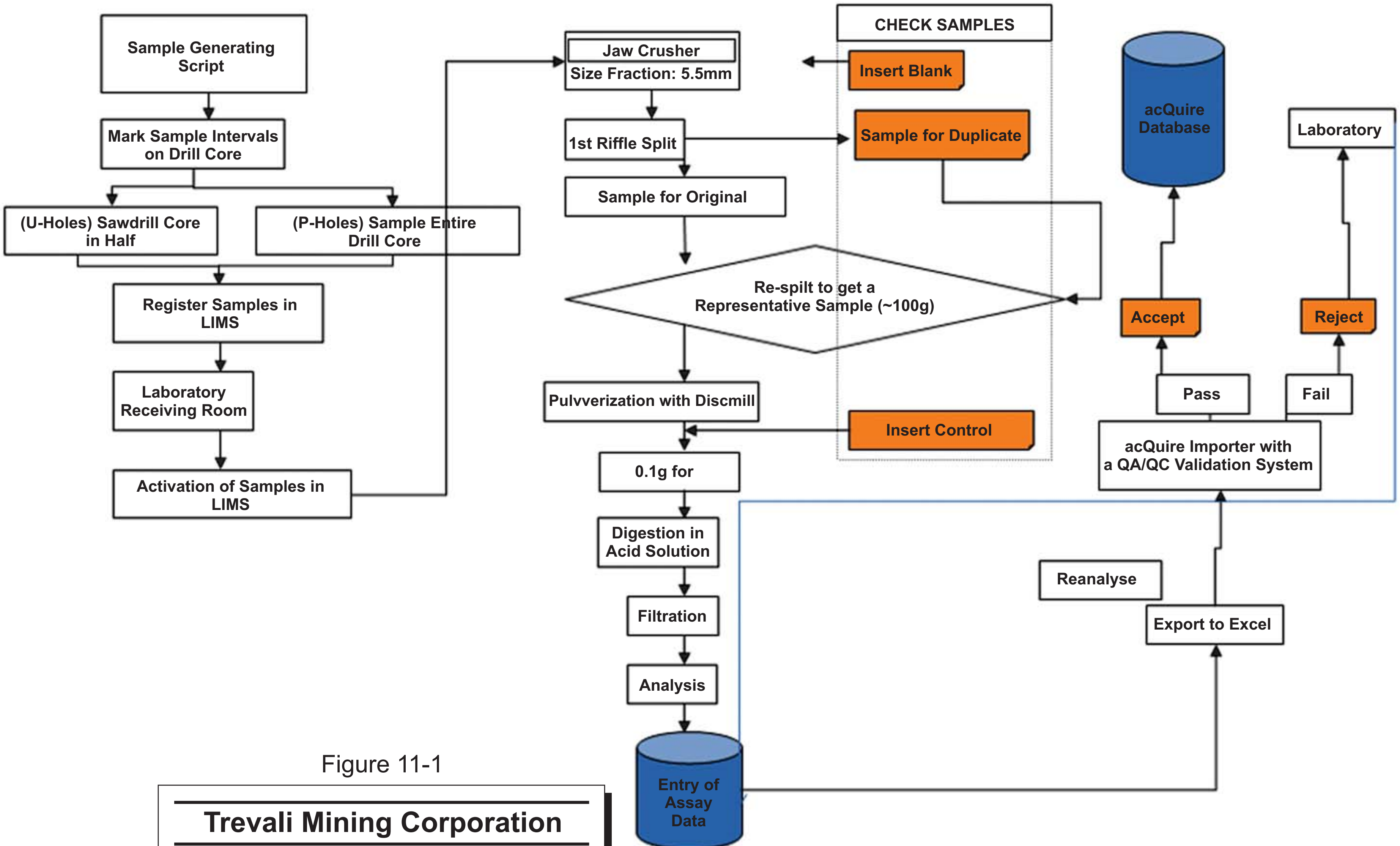


Figure 11-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Flow Chart of theRosh Pinah Sample Preparation, Analysis, and QA/QC Processes

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

QUALITY ASSURANCE AND QUALITY CONTROL

Rosh Pinah has implemented formal QA/QC system since 2009 to track accuracy and precision and to address any bias that may occur. Standards procedures developed and followed include the submission of blanks, duplicate samples, and Certified Reference Material (CRM) to measure precision, accuracy, and bias in the sampling and analytical process.

Between December 1, 2015 and October 31, 2016, a total of 1,653 QA/QC samples were analyzed including 351 duplicates, 356 CRMs, and 946 blanks.

BLANKS

The regular submission of blank material is used to assess contamination during sample preparation and to identify sample numbering errors. The Rosh Pinah blanks consist of fist-size un-mineralized, interlaminated sandstone and limestone collected from the Pickelhaube Formation at a locality approximately 4 km west of Rosh Pinah. Two composites of the blank material were analyzed by the Mintek Laboratory by ICP spectrometry for Zn, Pb, Fe, Cu, Mg, and Mn. Silver was analyzed for by AA.

Blank samples are inserted at every nth +3 sample interval in each batch of samples submitted to the RPML. Table 11-1 presents the acceptable limits for blank analyses.

TABLE 11-1 ACCEPTABLE LIMITS FOR BLANK ANALYSES
Trevali Mining Corporation – Rosh Pinah Mine

Element	Acceptable Minimum	Acceptable Maximum
Ag (ppm)	0	5.00
Cu (%)	0	0.05
Fe (%)	0	1.36
Mg (%)	0	1.07
Mn (%)	0	0.05
Pb Total (%)	0	0.05
Zn Total (%)	0	0.05

Nine hundred and forty-six (946) blank samples were analysed for this period with 38 samples plotting outside the 2 SD error limit. Two sample swaps were identified and corrected (p5495_010 and p5660_014).

CERTIFIED REFERENCE MATERIALS (STANDARDS)

Results of the regular submission of CRMs are used to monitor analytical accuracy and to identify potential problems with specific batches. Specific pass/fail criteria are determined from the standard deviation (SD) provided for each CRM. The conventional approach for setting standard acceptance limits is to use the mean assay ± two standard deviations (SD) as a warning limit and ± three SD as a failure limit. Results falling outside of the ± three SD failure limit must be investigated to determine the source of the erratic result, either analytical or clerical. At Rosh Pinah, the failure criterion is two consecutive standards outside the two SD limit.

CRMs are inserted at every (n^{th} +3) sample interval as control samples in each batch of samples submitted to the laboratory, to determine the accuracy and precision of the analytical results.

The African Mineral Standards (AMIS) set are classified in five grade categories: AMIS0158 (1.62% Zn), AMIS0157 (3.03% Zn), AMIS0153 (8.08% Zn), AMIS0149 (15.37% Zn), AMIS0147 (29.05% Zn). This set of Matrix Matched CRMs was prepared and certified by African Mineral Standards (AMIS) from material supplied by the Rosh Pinah mine.

A pass fail criteria and resubmission protocol has been adopted and the following points highlight this for CRM samples.

Pass/Fail Criteria and Resubmission (*batch = borehole)

- Critical elements: Zn, Pb, Ag, Cu, and Mn are to be considered; if any one of the critical elements fail then the CRM failed.
- If a single assay (per batch) plots outside the 3SD line for any of the critical elements, then the set of samples directly above the failed CRM (including the CRM) from the blank are to be resubmitted for reanalysis.
- If two assays sequential to each other (per batch) plot outside the 2SD line then the entire batch should be resubmitted.

Tables 11-2 to 11-6 present the summary statistics for the CRMs.

The element that performed the worst for all CRMs was Fe. Rosh Pinah will adjust the pass fail criteria for this element shall be adjusted so that it will fail when it plots outside 3SDs.

CRM AMIS0147

Four samples were analysed for this period. This CRM performed relatively. All samples plotted within the 2SD limits for Zn, Pb, Mn, Mg, Cu, and Ag. One sample plotted outside 2 SDs for Fe.

TABLE 11-2 SUMMARY STATISTICS FOR CRM AMIS0147
Trevali Mining Corporation – Rosh Pinah Mine

Element	Standard Value	Standard Deviation	2 Standard Deviations	Minimum	Maximum	3 Standard Deviations
Ag (ppm)	62.8	5	65	65	2.5	7.5
Cu (%)	0.644	0.0368	0.645	0.645	0.0184	0.0552
Fe (%)	4.92	0.24	4.88	4.88	0.12	0.36
Pb Total (%)	3.32	0.15	3.38	3.38	0.075	0.225
Zn Total (%)	29.05	1.2	28.5	28.5	0.6	1.8

CRM AMIS0149

One hundred and thirty-two samples were analysed. The number of failed assays (outside 2 SDs) for elements analysed are as follows: Zn (3), Pb (1), Mn (1), Mg (12), Fe (25), Cu (2), and Ag (1). Sample p5660_13 failed for all elements. This was identified as a sample swap and it was corrected.

TABLE 11-3 SUMMARY STATISTICS FOR CRM AMIS0149
Trevali Mining Corporation – Rosh Pinah Mine

Element	Standard Value	Standard Deviation	2 Standard Deviations	Minimum	Maximum	3 Standard Deviations
Ag (ppm)	30.1	1.15	2.3	27.8	32.4	3.45
Cu (%)	0.3769	0.0103	0.0206	0.3563	0.3975	0.0309
Fe (%)	2.81	0.07	0.14	2.67	2.95	0.21
Pb Total (%)	1.71	0.04	0.08	1.63	1.79	0.12
Zn Total (%)	15.37	0.27	0.54	14.83	15.91	0.81

CRM AMIS0153

One hundred and eighty-one samples were analyzed. The number of failed assays (outside 2SDs) for elements analyzed are as follows: Zn (3), Pb (3), Mn (10), Mg (2), Fe (62), Cu (2), and Ag (1).

TABLE 11-4 SUMMARY STATISTICS FOR CRM AMIS0153
Trevali Mining Corporation – Rosh Pinah Mine

Element	Standard Value	Standard Deviation	2 Standard Deviations	Minimum	Maximum	3 Standard Deviations
Ag (ppm)	19.9	0.65	1.3	18.6	21.2	1.95
Cu (%)	0.1993	0.0057	0.0114	0.1879	0.2107	0.0171
Fe (%)	2.23	0.04	0.08	2.15	2.31	0.12
Pb Total (%)	1.02	0.025	0.05	0.97	1.07	0.075
Zn Total (%)	8.84	0.17	0.34	8.5	9.18	0.51

CRM AMIS0157

Thirty-seven samples were analyzed. The number of failed assays (outside 2 SDs) for elements analyzed are as follows: Zn (0), Pb (3), Mn (1), Mg (2), Fe (7), Cu (2), and Ag (1).

TABLE 11-5 SUMMARY STATISTICS FOR CRM AMIS0157
Trevali Mining Corporation – Rosh Pinah Mine

Element	Standard Value	Standard Deviation	2 Standard Deviations	Minimum	Maximum	3 Standard Deviations
Ag (ppm)	6.7	0.6	1.2	5.5	7.9	1.8
Cu (%)	0.0698	0.00163	0.0033	0.0665	0.0731	0.00495
Fe (%)	1.41	0.04	0.08	1.33	1.49	0.12
Pb Total (%)	0.3432	0.0122	0.0224	0.3208	0.3656	0.0336
Zn Total (%)	3.03	0.06	0.12	2.91	3.15	0.18

CRM AMIS0158

Only one sample was analyzed for this CRM and it passed for all elements except Cu.

TABLE 11-6 SUMMARY STATISTICS FOR CRM AMIS0158
Trevali Mining Corporation – Rosh Pinah Mine

Element	Standard Value	Standard Deviation	2 Standard Deviations	Minimum	Maximum	3 Standard Deviations
Cu (%)	0.037	0.0008	0.0016	0.0354	0.0386	0.0024
Fe (%)	1.92	0.09	0.18	1.74	2.1	0.27
Pb Total (%)	0.2162	0.0096	0.0192	0.197	0.2354	0.0288
Zn Total (%)	1.62	0.03	0.06	1.56	1.68	0.09

DUPLICATES

Duplicate samples are used to test for contamination in the laboratory and for overall consistency in performance. These duplicates can be made of the original sample material (termed field duplicates), the crushed reject material (reject), or the pulverized sample material (pulp). Each type of duplicate tests for inaccuracy at different stages in the sample preparation and assay procedure.

Rosh Pinah duplicates consist of splitting every 14^{th} sample in a batch into two fractions at the crushing stage. When a borehole has less than 14 samples, the geologist manually selects which sample will be duplicated. The drill core sample is jaw crushed to a size of -5.5mm and split into two fractions, one of which is inserted at the n^{th} +2 sample interval and processed in exactly the same way as the parent sample (nth sample interval). The duplicate sample (nth +2 sample) is assigned a new sample number.

Duplicates are taken to quantify precision and any bias introduced after the parent sample was duplicated (i.e., during milling, digestion, and analysis). Sample duplication is also conducted to ensure and demonstrate analytical repeatability.

ZINC DUPLICATE ANALYSIS

Zinc duplicates performance was very good, with only three (less than 1%) of the duplicate pairs plotted outside the error limit.

LEAD DUPLICATE ANALYSIS

For lead, 44 (12.5%) out of the 351 pairs plotted outside the 10% warning limit and 22 (6%) plotted outside the error limit. The majority of the duplicate errors were found at low lead grades (below 1%). This suggests that repeatability of lead analyses is poor below 1% Pb.

IRON DUPLICATE ANALYSIS

Iron performed well with only one duplicate pair occurring outside the 10% limit. The relative difference plot for iron supports the correlation represented in the duplicate plots, only one pair occurs outside the 10% relative difference limits.

COPPER DUPLICATE ANALYSIS

Copper duplicates performed well, only 19 (5%) of the duplicate pairs occurred outside the defined limits. These occurred at low copper grades (less than 0.1% Cu).

SILVER DUPLICATE ANALYSIS

Silver performance was also good with five duplicate pairs (1.4%) occurring outside the error limits. Two duplicate pairs plotted outside of the 10% error limit.

MAGNESIUM DUPLICATE ANALYSIS

Magnesium duplicates performed well; only six duplicate pairs occurred outside the 10% error limit. Only one duplicate pair occurred outside the error limit.

MANGANESE DUPLICATE ANALYSIS

Manganese duplicates performed similar to magnesium, five duplicate pairs (1.4%) plotted outside the 10% limit and two pairs plotted outside the error limit.

UMPIRE ANALYSES

Pulp samples from the RPML are also submitted as checks to external laboratories such as Mintek Laboratory in South Africa. RPA notes, however, that this procedure has not recently been followed.

In RPA's opinion, the QA/QC program as designed and implemented by Rosh Pinah is adequate and the assay results within the database are suitable for use in a Mineral Resource estimate.

SECURITY

RPA is not aware of any major security issues at the Rosh Pinah mine, core processing center, or the RPML. Access to these sites is restricted to authorized personnel and they are staffed continuously. Drill and mine samples are handled and transported only by Rosh Pinah personnel or contractors. Samples are picked up and transported to the RPML by Rosh Pinah Staff. Umpire samples are delivered by commercial carrier.

Logging, sampling, and analytical data are captured in an acQuire database, which resides on the company servers, and is backed up daily. The integrity of this database is the responsibility of a Database Manager.

12 DATA VERIFICATION

SITE VISIT

During the January site visit, RPA toured the underground operations to review geology and mineralization types in a number of exposures. RPA also observed the core logging, sampling, QA/QC, and database management procedures conducted by the Mine Geology department as well as the RPML. RPA is of the opinion that database verification procedures for the Rosh Pinah comply with industry standards and are adequate for the purposes of Mineral Resource estimation.

ROSH PINAH DATABASE VERIFICATION PROCEDURES

Core logging at Rosh Pinah mine is done on surface using a standard form in Pocket acQuire, software designed for the Compaq Palmtop computers which is totally compatible with the geological acQuire (SQL) database of the mine. The capture screen in Pocket acQuire is designed such that the software prompts the geologist to select descriptions of fields, lithology, colour, sedimentary grading, structure (folding, faulting, cleavage, etc.) alteration, and mineralization, already stored for each field (validation tables). When logging, the geologist records all collar and survey data for the drillhole, lithological, structural, and grading data using the Palmtop computers. Only values which are present in the validation tables can be entered into the database, except for fields such as depth, comments, hole numbers, etc. Information is then imported into the MineSight software via acQuire

Core recovery is measured and imported into MineSight via the acQuire database software for every borehole (regional or underground) drilled. Validation on core recovery is done on a continuous basis by the Database Manager and Senior Geologists.

SABLE software was previously used as the geotechnical data management system, however, data has recently been migrated to acQuire. Validation before and after migration was done and signed-off. The process allows for consistent, auditable, and reliable acquisition of geotechnical data for use in optimizing mine design, support design and planning

The acQuire software is set up with various validation tables, which ensures that data entered and imported into the database adheres to standard coding. The acQuire software has numerous internal validations performed while data is entered or imported. These internal validations ensure that the drill hole numbers and sample numbers are not duplicated and that no gaps and overlaps exist in the geological or sample data.

The database manager is responsible for importing the assay data via the Laboratory Information System (LIMS), validating the data, compiling the QA/QC results, and resolving QA/QC failures. Much of the validation work is done using scripts and utilities run from within acQuire.

Once all the relevant information is available in the database, three standardized reports are printed:

- Final Log Sheet – containing all collar, geological, and assay information.
- Assay Report – containing all sample information.
- Core Recovery and Downhole Survey Report.

These reports are then inspected. Assay information is compared to geological descriptions in conjunction with all the available information. This ensures that all the required information has been added to the database and that it is correct and credible.

Once the data is verified, the final log sheet is signed off by the responsible geologist and handed to the geo-data geologist. The Database Manager inspects the log sheet, as a final check, changes the hole to a read-only status on the database, and files the hard copy of the log sheet. All drill hole data in the database is available in the 3D modelling software MineSight at all times.

RPA notes that with respect to QA/QC results, all sample batches which failed the defined pass/fail criteria were submitted for re-analysis and subsequent analysis returned acceptable results.

EXTERNAL DRILL HOLE DATA VALIDATION

Databases have been audited during the modelling processes over the last few years by several geologists on site as well by resources geologists in the Glencore Zinc Technical Services Group. A full external database audit was conducted in 2016 by Glencore Zinc Technical Services, and flagged some issues with historical data, however, major issues were only encountered in mined out zones which no longer constitute part of the resource. Only minor problems were found in the audit for active zones and these issues were corrected in the database during 2016.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

In 2016, RPZC started mining the WF3 orebody, which will constitute approximately 67% of the LOM feed (Table 13-1).

The WF3 Orebody is a zoned orebody:

- Zone 1: Zinc and iron rich, poor in lead (Proximal facie).
- Zone 2: Lower zinc and iron, and increase in lead + barite (Distal facie).

TABLE 13-1 LIFE OF MINE PRODUCTION SCHEDULE ORE SOURCE
Trevali Mining Corporation – Rosh Pinah Mine

Ore Source		Total	2017	2018	2019	2020	2021	2022	2023	2024
Other Zones	%	33	45	43	55	9	55	25	3	25
WF3 Zone 1	%	40	8	21	16	67	20	49	97	41
WF3 Zone 2	%	27	47	36	29	24	25	26	-	34
Total WF3 Orebodies	%	67	55	57	45	91	45	75	97	75

The WF3 Zone 2 ore is classified as “hard”. The hard ore fraction in run of mine (ROM) ore will increase from 43% to 50% during WF3 Zone 2 mining thus affecting the mill throughput. WF3 Zone 1 ore is softer, however, with low lead feed grades resulting in lower lead conc. production. The zinc content of sphalerite is 2% to 4% lower than previously mined orebodies, potentially affecting the recoveries and/or concentrate grades. Sphalerite is highly and complexly intergrown with pyrite. Pyrite depression is required and will require higher collector dosages, increasing processing cost.

These variations in the orebody (higher iron and harder ore) have necessitated the installation of regrind circuits (the regrind project) in both the lead and zinc circuits as well as additional cleaning capacity in the lead circuit to optimize beneficiation and continue producing concentrates at a saleable grade. RPZC has stated that the installation of the regrind project will ensure that the plant achieves saleable concentrate grade at all times as well as significantly reducing iron and mercury penalties in the zinc concentrate. The approved budget for the regrind project is $7.3 million in 2017 and $1.1 million in 2018 with a reported payback period just under three years.

Expected benefits included in the LOM process plant production schedule from 2018 onwards include:

- Lead recovery increase of 2.5%
- Lead concentrate grade increase of 0.5%
- Zinc recovery increase of 0.9%
- Zinc concentrate grade increase of 1.6%
- Reduced zinc impurities penalty of $5.00/t of zinc concentrate

RPA agrees with the results of the regrind project study.

On March 2, 2017, RPZC signed a contract with DRA Mineral Projects (Pty) Ltd (DRA) for detailed engineering design, procurement of equipment and services, and construction management (EPCM) of the mechanical, civil, and structural work required for the installation of regrind mills, additional lead cleaning capacity, and changes required to the dewatering circuits to accommodate finer material. Also included in the scope of work is the replacement of the current outdated programmable logic circuit (PLC) and SCADA system, additional sampling points for Courier x-ray sample analyses and the final cold commissioning of the upgraded plant.

14 MINERAL RESOURCE ESTIMATE

SUMMARY

Geological interpretation and Mineral Resource estimation were completed by Rosh Pinah, and audited by RPA, with an effective date of December 31, 2016. The Mineral Resources have been completed to a level that meets industry standards and are compliant with the terms and definitions provided in the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions) as adopted by NI 43-101.

In the CIM classification, a Mineral Resource is defined as "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction". Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the "economically mineable part of a Measured and/or Indicated Mineral Resource" demonstrated by studies at Pre-Feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

Rosh Pinah Mineral Resources are presented as a series of discrete lenses that are interconnected along the OEH (Figure 14-1). Rosh Pinah Mineral Resources, estimated as of December 31, 2016, are summarized in Table 14-1. The dimensions of the envelope containing the currently defined ore lenses are approximately 1,800 m long from north to south, 700 m wide from east to west, and 700 m deep at its thickest points. Table 14-2 lists the Mineral Resources individually for each lens and resource category.

TABLE 14-1 MINERAL RESOURCE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Class	Tonnes	Grade			Contained Metal (Tonnes)	
		Zn (%)	Pb (%)	Ag (g/t))	Zn	Pb
Measured	3,352,400	8.74	1.65	27.02	**292,900**	**55,200**
Indicated	6,588,100	7.40	1.44	22.77	**487,700**	**94,700**
Measured + Indicated	**9,940,600**	**7.85**	**1.51**	**24.20**	**780,500**	**149,900**
Inferred	2,929,300	5.96	1.06	30.04	175,000	30,900

Notes:
1. CIM definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 4% Zn Equivalent.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

TABLE 14-2 MINERAL RESOURCES BY LENS AND RESOURCE CATEGORY – AS OF DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Class	Lens	Tonnes	Grade					Contained Metal (Tonnes)	
			Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)	Zn	Pb
Measured	Western Orefield 1	134,620	8.20	2.82	35.00	0.15	2.99	11,040	3,800
	Western Orefield 2	154,800	6.50	2.41	14.50	0.07	3.48	10,060	3,730
	Western Orefield 3	1,511,260	10.68	0.88	16.15	0.34	9.77	161,360	13,220
	Western Orefield 4	21,140	5.66	3.58	23.73	0.10	4.98	1,200	760
	Eastern Orefield 1	380,950	8.39	1.62	43.59	0.22	2.40	31,960	6,170
	Eastern Orefield 2	232,570	7.54	2.34	55.66	0.10	2.84	17,540	5,440
	Southern Orefield 1 (N)	287,080	8.34	2.76	28.45	0.13	3.80	23,940	7,920
	Southern Orefield 1 (S)	57,980	9.32	4.70	41.03	0.23	3.47	5,400	2,730
	Southern Orefield 3:	266,820	5.99	2.81	24.40	0.16	12.05	15,980	7,500
	A. MINE 2	7,760	6.85	3.12	99.25	0.15	3.58	530	240
	A. MINE East	31,550	7.39	0.90	37.42	0.09	4.41	2,330	280
	B. MINE East	212,000	4.39	1.42	39.66	0.04	3.03	9,310	3,010
	North of C Mine	53,900	4.12	0.79	32.71	0.04	3.46	2,220	430
	Total Measured	**3,352,400**	**8.74**	**1.65**	**27.02**	**0.23**	**6.77**	**292,870**	**55,230**

Class	Lens	Tonnes	Grade					Contained Metal (Tonnes)	
			Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)	Zn	Pb
Indicated	Western Orefield 3	4,940,380	7.38	0.86	14.68	0.24	6.89	364,350	42,490
	Eastern Orefield 1	622,010	8.83	3.21	76.44	0.21	1.98	54,920	19,970
	Eastern Orefield 2	51,730	8.82	3.56	80.17	0.16	3.32	4,560	1,840
	Southern Orefield 1 (N)	193,110	7.42	3.51	18.33	0.14	2.62	14,330	6,780
	Southern Orefield 1 (S)	36,080	4.83	2.76	43.96	0.10	2.59	1,740	1,000
	Southern Orefield 3	418,300	7.43	4.40	23.19	0.40	4.87	31,080	18,410
	BAE	144,890	5.07	0.96	15.66	0.04	4.55	7,350	1,390
	B. MINE East	35,020	4.36	1.52	48.47	0.05	3.19	1,530	530
	Northern Orefield 3	146,640	5.32	1.57	47.63	0.05	3.97	7,800	2,300
	Total Indicated	**6,588,100**	**7.40**	**1.44**	**22.77**	**0.23**	**5.98**	**487,660**	**94,710**
Inferred	Western Orefield 3	367,500	5.63	0.78	14.70	0.09	4.42	20,700	2,900
	Western Orefield 4	1,197,500	5.92	0.45	12.43	0.09	6.82	70,900	5,400
	AAB	1,347,900	6.06	1.66	49.71	0.09	3.24	81,700	22400
	A. MINE 1	12,000	8.97	1.87	37.00	0.06	3.72	1,100	200
	A. MINE EAST	4,300	6.40	1.62	59.79	0.10	3.68	300	70
	Total Inferred	**2,929,300**	**5.96**	**1.06**	**30.04**	**0.09**	**4.85**	**174,600**	**30,900**

Notes:
1. CIM definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 4% Zn Equivalent.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

RPA is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

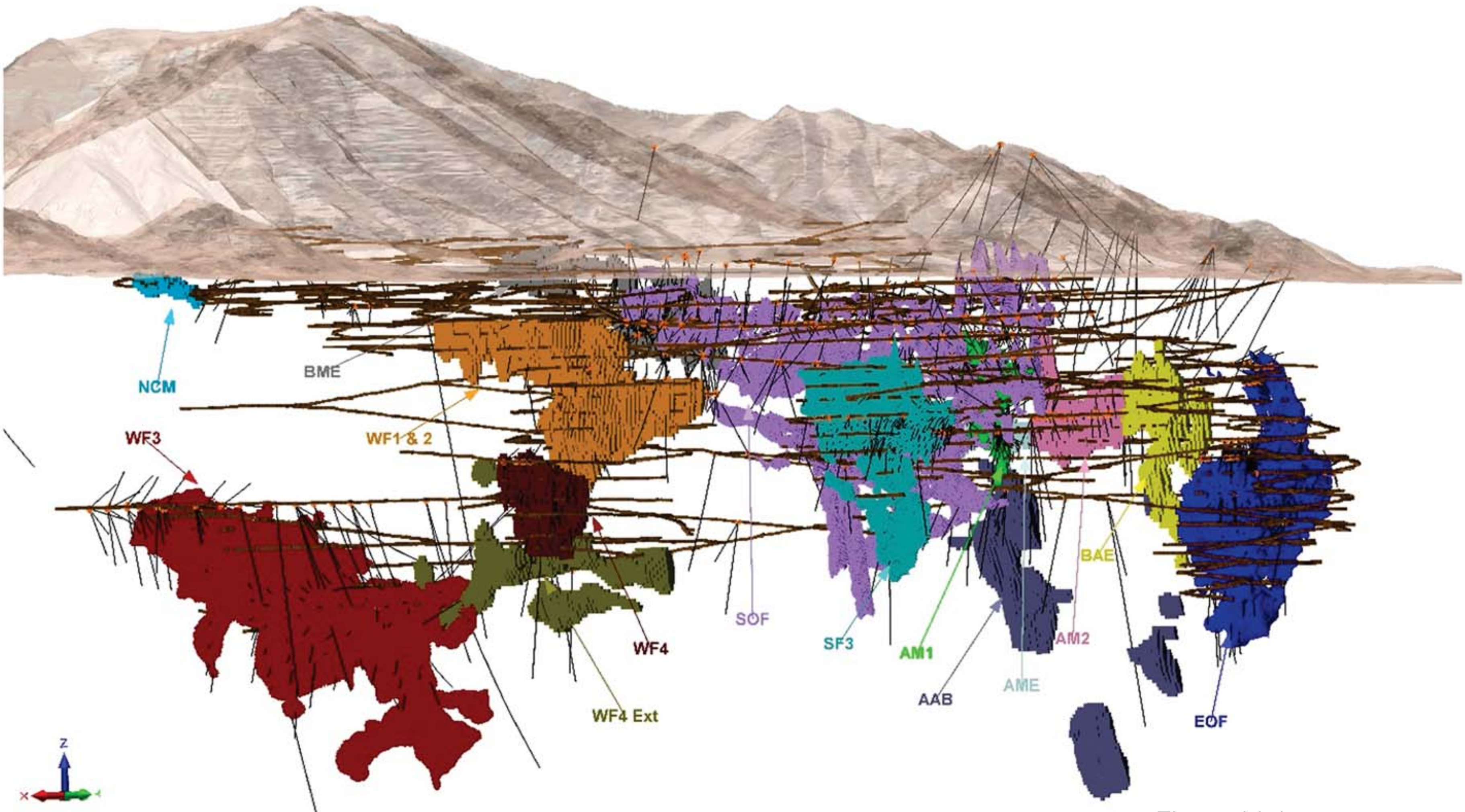


Figure 14-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Schematic View of Defined Mineralization Lenses Within the Ore Equivalent Horizon

Legend:

Taupe = Surface

Brown Lines = Current Underground Development

Coloured Areas = Defined Orebodies

0 100 200 300 400
Metres

April 2017

Source: RPA, 2017.

CUT-OFF GRADE

The Mineral Resource cut-off grade for the Rosh Pinah mine is a 4% Zn equivalent based upon the approximate cost of milling and transport of ore to surface. Copper is currently not considered economic or recoverable and is therefore not included in the Zn equivalent calculation. The Zn Equivalent formula used for the 2016 Mineral Resource estimate is presented below:

Zn Equivalent = Zn + (Pb x 1.01) + (Ag x 0.026)

PRIMARY LENSES

Rosh Pinah consists of four primary lenses, with mine colloquial names, including the Eastern Orefield (EF1), Southern Orefield 1 (SOF1), Southern Orefield 3 (SOF3), and Western Orefield 3 (WF3). Until 2015, EF1 was the main constituent in Rosh Pinah ROM ore. EF1 is, however, nearing depletion and focus for mining is shifting to Western WF3, which initiated mining in 2016, and which is the main focus of the LOM plan.

The primary lenses account for approximately 3.0 Mt of Measured, 6.4 Mt of Indicated and 1.6 Mt of Inferred Mineral Resources.

WESTERN OREFIELD 3

WF3 currently extends laterally from drill section +90 to +580 and vertically from +110 to -330 levels.

DRILL HOLE DATABASE

The drill hole database for WF3 contains 541 holes. At the time of estimation, a number of holes did not yet have assays received from the laboratory. These holes were used for interpretation only, and were removed for estimation to avoid adding null values into the estimate. A further 94 drill holes were excluded due to various reasons such as being too down-dip or parallel to the dip of the lens or issues with collar or downhole survey.

GEOLOGICAL MODEL

The mineralization 4% Zn equivalent wireframe was modelled with Leapfrog Geo software using the vein tool. Visual analysis of the dataset and distribution of the metal grades showed a distinct metal zonation within the deposit for all metals particularly lead and copper. Zinc grades above cut-off grade are present throughout the deposit, although high grades are constrained to distinct domains. In certain areas, distinct bands/limbs of high Zn-Cu mineralization can be observed adjacent to, yet spatially separate from a high grade lead limbs with lower zinc grade.

After analysis using Leapfrog interpolants at varying grade cut-offs, it was determined that separate high and low grade domains would be required to ensure that grade was not smeared throughout the 4% Zn equivalent resource domain. Leapfrog modelling was used to create structurally controlled high grade domains within the WF3 for each element. The remaining volume inside the WF3 was then assigned to be the low grade domain for that element.

After conducting the domaining of these elements at a cut-off, contact plot analysis was used to verify that there are indeed sharp changes in grade and distinct populations either side of these cut-offs. A summary of resultant domains used for estimation are summarized in Table 14-3 and illustrated in Figure 14-2.

TABLE 14-3 HIGH GRADE DOMAIN MODELLING – WF3
Trevali Mining Corporation – Rosh Pinah Mine

Domain	Grade Boundary
Mineralized Zone	4% Zn Equivalent
High Zinc	6% Zn
High Lead	0.70% Pb
High Copper	0.70% Cu
High Silver	20 ppm Ag
High Manganese	0.75% Mn
High Magnesium	6% Mg
High Iron	15% Fe

It was important that the local resolution of lead and copper was modelled as the cut-off grades are based on a Zn% Equivalent formula. Also, the resolution is significant for mine planning purposes, as high copper grades greatly reduce the lead recovery in the mill.

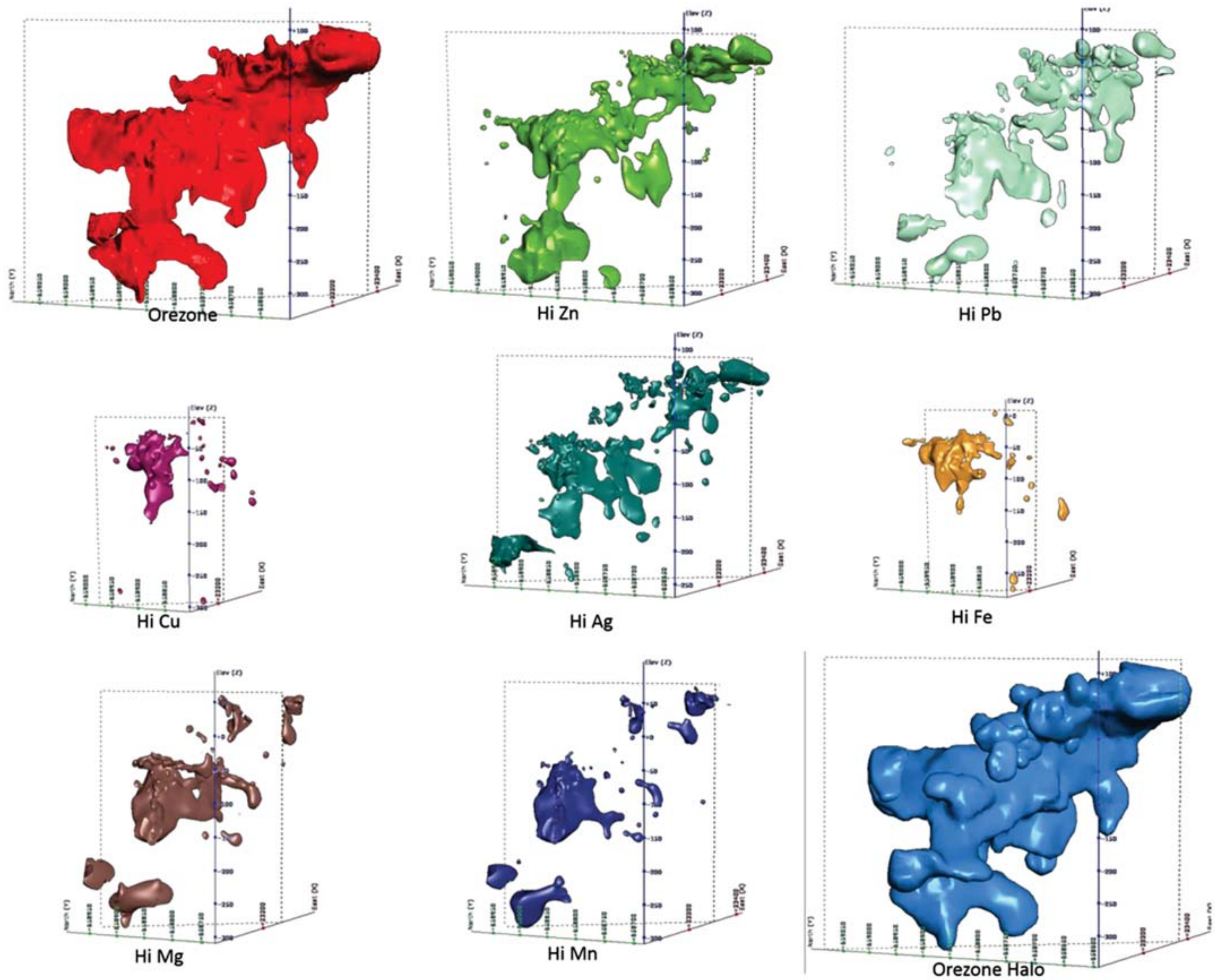


Figure 14-2

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Metal Grade Domains Used in the Estimation of WF3

April 2017

Source: RPA, 2017.

COMPOSITING

WF3 composites were extracted inside and outside the 4% Zn equivalent mineralized zone in Leapfrog Geo software at 1.5 m composite lengths. The minimum length requirement at boundaries was 0.75 m (50% of standard composite length). The composites were then extracted inside each metal domain wireframe and a separate composite file generated for each domain.

In RPA's opinion, the composite length of 1.5 m is reasonable, given that the majority of samples are based on this 1.5 m length.

TREATMENT OF HIGH GRADES (CAPPING)

The only capping applied to grades in the WF3 estimation are for lead due to some areas of erratic high mineralization:

- Pb High Grade Domain = 8.30% Pb Cap.
- Pb Low Grade Domain = 3.50% Pb Cap.

The basic statistics of the composites after capping are listed in Table 14-4. RPA reviewed the capping levels and finds them reasonable.

TABLE 14-4 BASIC STATISTICS OF ALL COMPOSITES USED IN RESOURCE ESTIMATION – WF3
Trevali Mining Corporation – Rosh Pinah Mine

Domain	No. of Composites	Minimum Grade	Maximum Grade (After Capping)	Mean Grade	Median Grade
Hi Ag (ppm)	1,427	1.79	467.24	37.33	29.59
Lo Ag (ppm)	4,014	-	185.88	10.47	9.34
Hi Cu (%)	528	0.07	4.18	1.27	1.11
Lo Cu (%)	4,913	-	3.00	0.22	0.13
Hi Pb (%)	1,849	0.02	**8.30**	2.43	1.87
Lo Pb (%)	3,592	-	**3.50**	0.31	0.10
Hi Zn (%)	3,120	0.06	49.95	12.67	10.83
Lo Zn (%)	2,321	-	38.99	5.20	4.56
Hi Fe (%)	736	2.28	41.28	20.08	19.38
Lo Fe (%)	4,913	-	41.28	7.35	5.66
Hi Mg (%)	1,147	0.45	15.00	7.81	7.85
Lo Mg (%)	4,294	-	13.30	2.47	2.01
Hi Mn (%)	788	0.08	9.19	1.03	0.96
Lo Mn (%)	4,653	-	5.51	0.36	0.33

Note: Values in bold have been capped.

BLOCK MODEL

The block model is non-rotated, with a size of 5 m by 5 m by 5 m, which is then sub-blocked down to a minimum size of 1.25 m at domain boundaries (Table 14-5). These domain boundaries include resource domains, high and low grade elemental domains, and lithological domains.

The sub-blocked boundary blocks of the mineralized zone are also coded with a partial percent field in the range 0 to 1 (e.g. 0.8 = 80%) to allow Mine Planners to revise the sub-block minimum size to 0.625 m by 0.625 m by 0.625 m.

TABLE 14-5 WF3 BLOCK MODEL DESCRIPTION
Trevali Mining Corporation – Rosh Pinah Mine

Type	Y	X	Z
Minimum Coordinates (m)	658580	23005	-510
Maximum Coordinates (m)	659075	23495	130
Parent Block Size (m)	5	5	5
Sub-Block Size (m)	1.25	1.25	1.25
Rotation (°)	0	0	0

SPATIAL ANALYSIS (VARIOGRAPHY)

All elements have high grade and low grade domains with each domain estimated with “hard contact” methodology where only composites within the domain solid can be used to estimate a block in that respective domain.

A further grade-control/dilution domain (not included in the Mineral Resource estimate) was also estimated. This domain is a 10 m dilution halo expanded from the resource 4% Zn equivalent halo and is used in stope design evaluation to estimate possible planned and unplanned dilution.

BLOCK MODEL INTERPOLATION

The estimation of WF3 was conducted by RPZC in November 2016 using Surpac software. The principal elements of Zn, Pb, Cu, and Ag were estimated using ordinary kriging (OK). The supplementary elements Fe, Mg, and Mn were estimated using inverse distance to the power of three (ID^3). The Fe, Mg and Mn elements are required for plant operational purpose and for the estimation of potential penalties occurred in metal concentrate produced.

All estimates are prepared using a four pass approach to ensure all blocks are populated with grade estimates. Blocks were coded with the pass number which they were populated to aid in resource classification and the optimization of estimation parameters.

BULK DENSITY

The WF3 database contains sufficient density data to populate the density by interpolation. The composites were extracted inside the mineralization domains and any sample with a zero density value was removed. Density was interpolated into the model using these 1.5 m composites using ID^3. The search distance and search ellipses are presented in Table 14-6.

TABLE 14-6 ESTIMATION PARAMETERS USED FOR THE INTERPOLATION OF BULK DENSITY – WF3
Trevali Mining Corporation – Rosh Pinah Mine

Pass	Major Distance (m)	Semi-Major Ratio	Minor Ratio	Minimum No. of Samples	Maximum No. of Samples	Maximum No. of Samples per Drill Hole
1	40	2.03	3.48	10	20	8
2	80	2.03	3.48	8	20	6
3	122	2.03	3.48	4	15	6
4	122	2.03	3.48	2	15	6

MINERAL RESOURCE CLASSIFICATION

The resource classification of WF3 is based upon the drill spacing and estimation pass at which blocks are populated during the estimation. The Measured category is restricted to zones drilled on the 10 m by 10 m by 10 m grid or the 12.5 m by 12.5 m by 12.5 m grid. The Indicated category is assigned based upon geological confidence and which blocks are populated during the first or second pass for the estimation of zinc and lead. Lead, which has a shorter search distance than zinc, was used to determine the final boundary for conservatism.

A portion of WF3 at depth has been solely modelled using down-dip holes to inform interpretation and estimation. This zone was downgraded in terms of resource classification as true deposit volume is difficult to determine with these holes. This area of WF3 is not considered within any resource category but "Grouped Intersections" only. This area is modelled to show potential resource expansion and to obtain potential tonnes increase if further drilling at an appropriate orientation was conducted. This can also be seen in Figure 14-3.

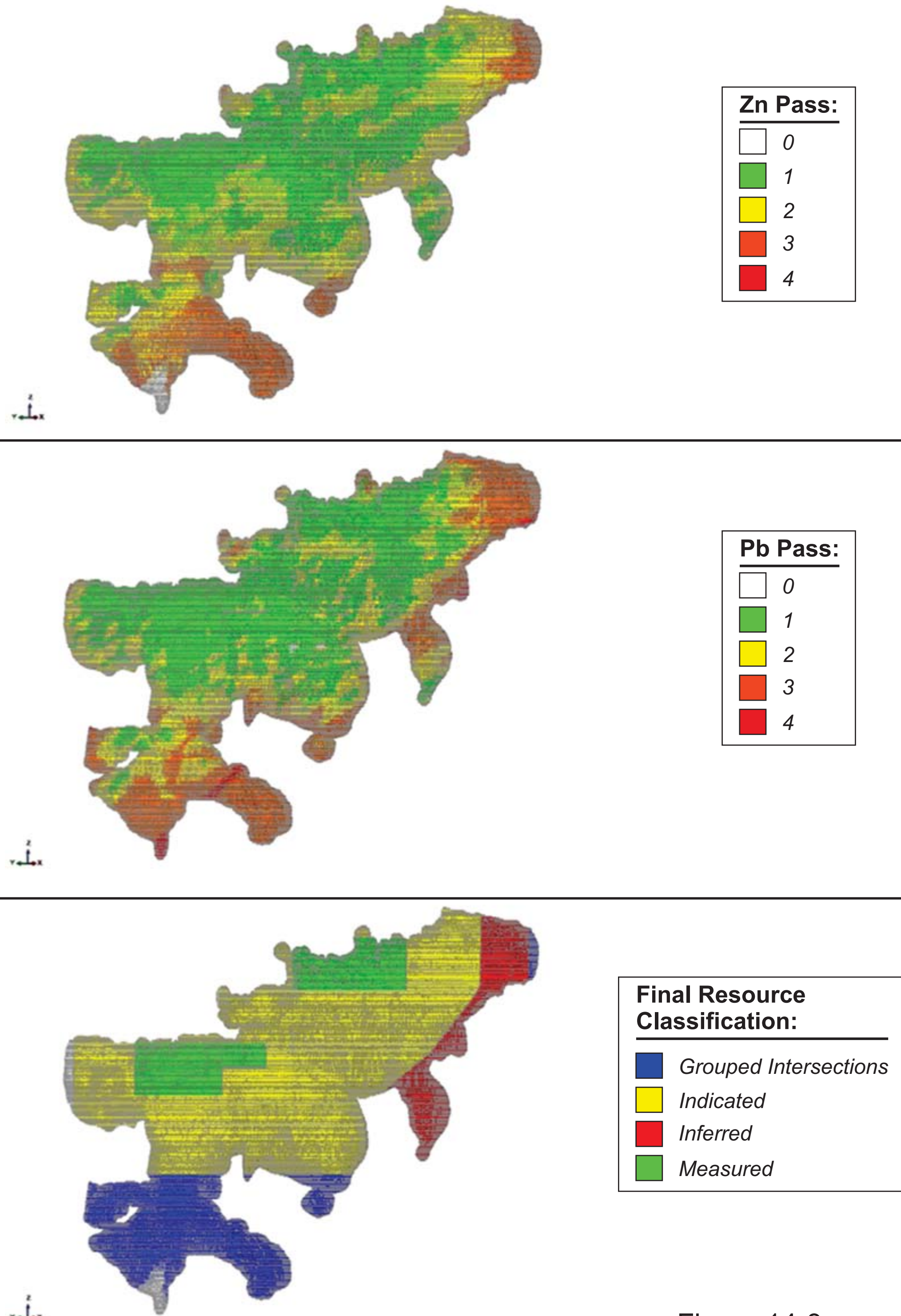


Figure 14-3

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

WF3 Blocks Coloured by Search Pass for Zn and Pb and Final Resource Class Assigned

April 2017 ***Source: Rosh Pinah Zinc Corp., 2016.***

MINING DEPLETION

At the end of 2016, only one stope had been mined from WF3. Both the stope and all sill development were depleted from the block model.

VALIDATION

The WF3 estimate was validated visually comparing the drill hole traces and grades versus those populated into the block model for all elements. The block model was also validated using swath plots in Excel for Zn, Pb, Ag, and Cu in both sections along the strike of the deposit and in varying elevation. Figures 14-4 to 14-11 present swath plots for Zn with all the mineralized zone domains. Both the swath plots and visual validation found no issues. A comparison with a recently mined stope on -30 level (Block C) also showed very good reconciliation with the block model for Zn, Pb, Cu, and Ag.

FIGURE 14-4 SWATH PLOT VALIDATION OF ZN ESTIMATES BY SECTION ALONG STRIKE – WF3

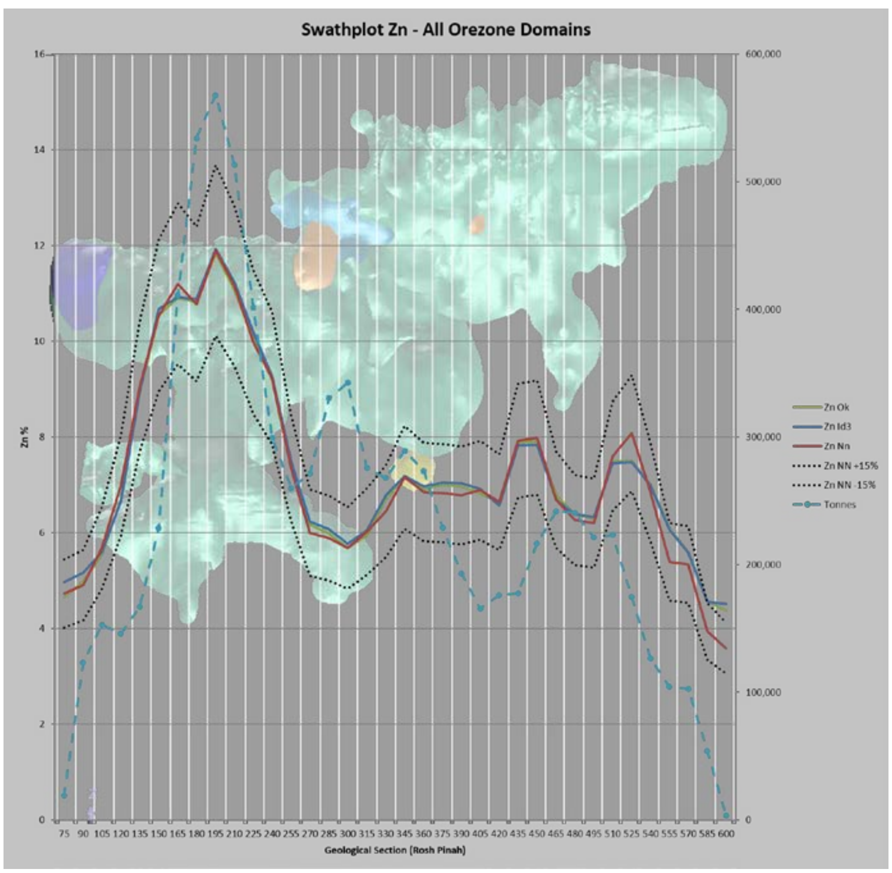


FIGURE 14-5 SWATH PLOT VALIDATION OF ZN ESTIMATES BY ELEVATION – WF3

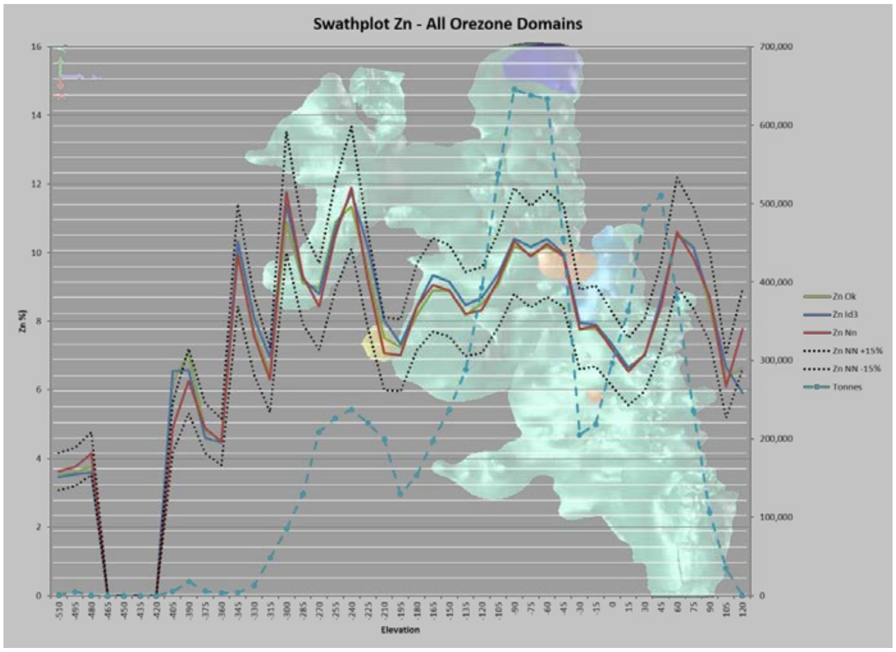


FIGURE 14-6 SWATH PLOT VALIDATION OF PB ESTIMATES BY SECTION ALONG STRIKE – WF3

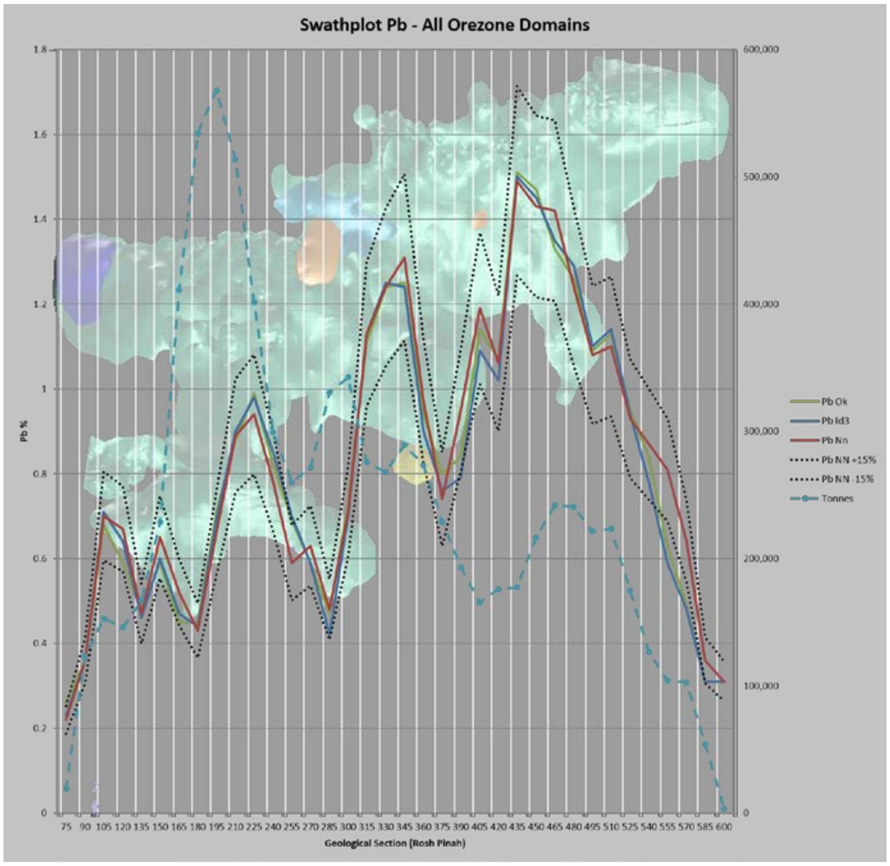


FIGURE 14-7 SWATH PLOT VALIDATION OF PB ESTIMATES BY ELEVATION – WF3

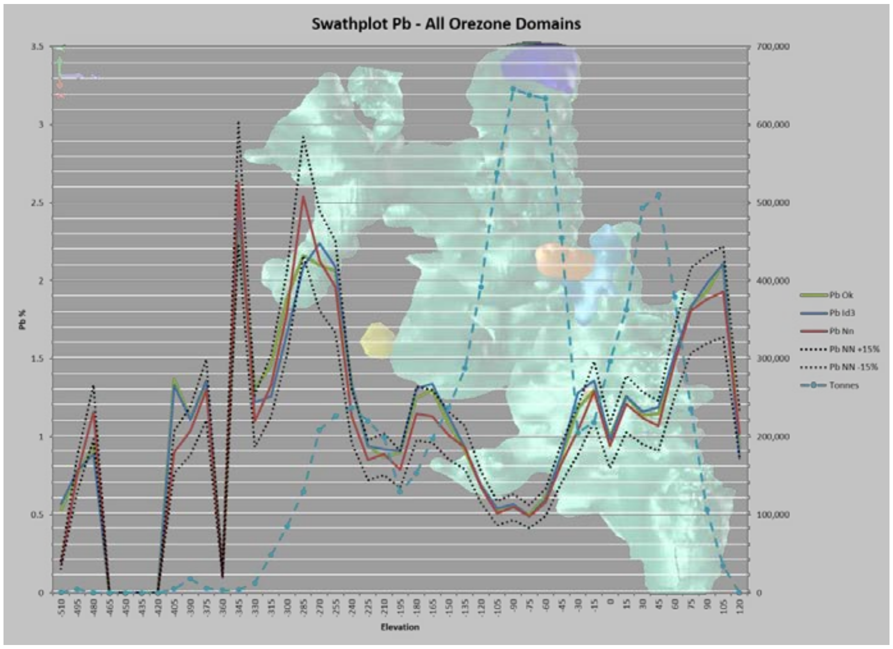


FIGURE 14-8 SWATH PLOT VALIDATION OF CU ESTIMATES BY SECTION ALONG STRIKE – WF3

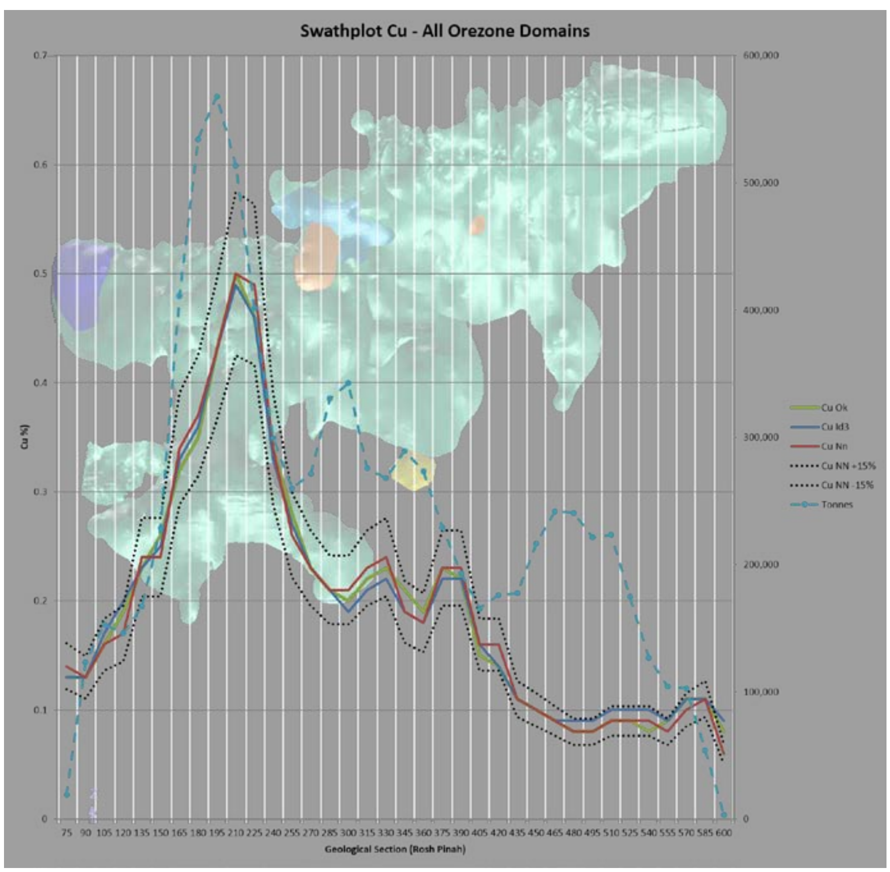


FIGURE 14-9 SWATH PLOT VALIDATION OF CU ESTIMATES BY ELEVATION – WF3

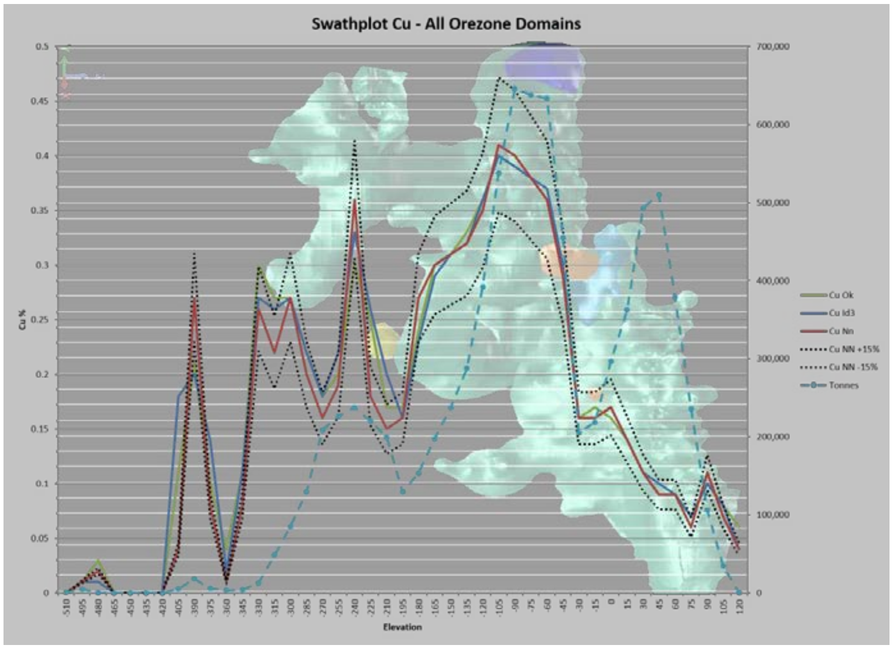


FIGURE 14-10 SWATH PLOT VALIDATION OF AG ESTIMATES BY SECTION ALONG STRIKE – WF3

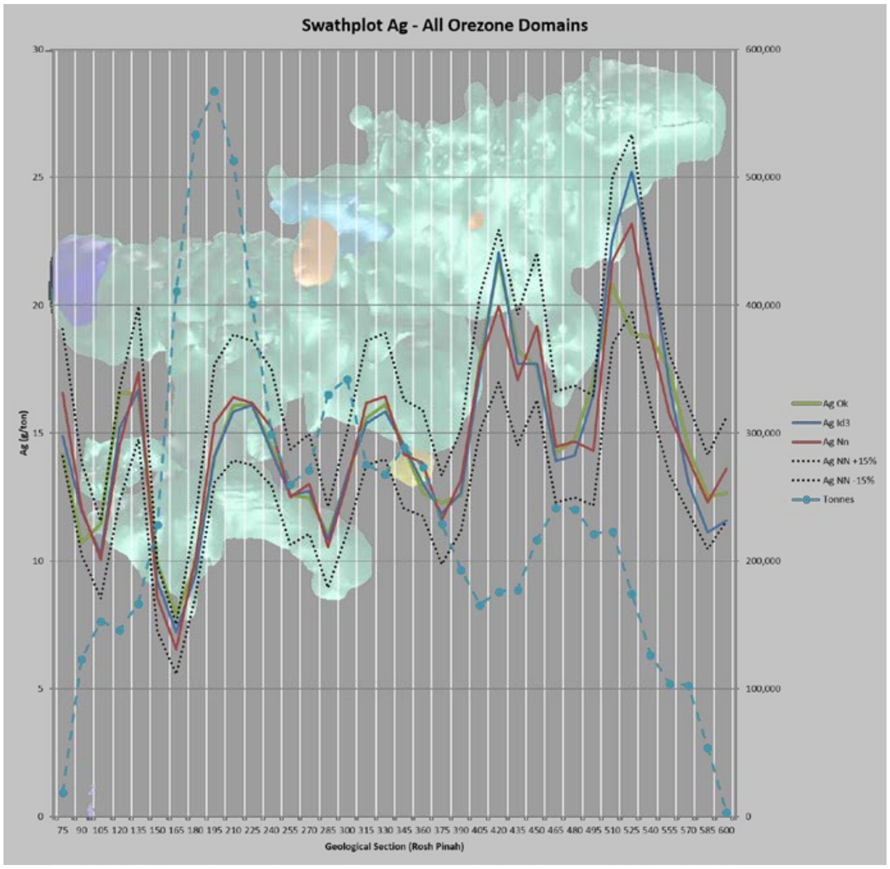
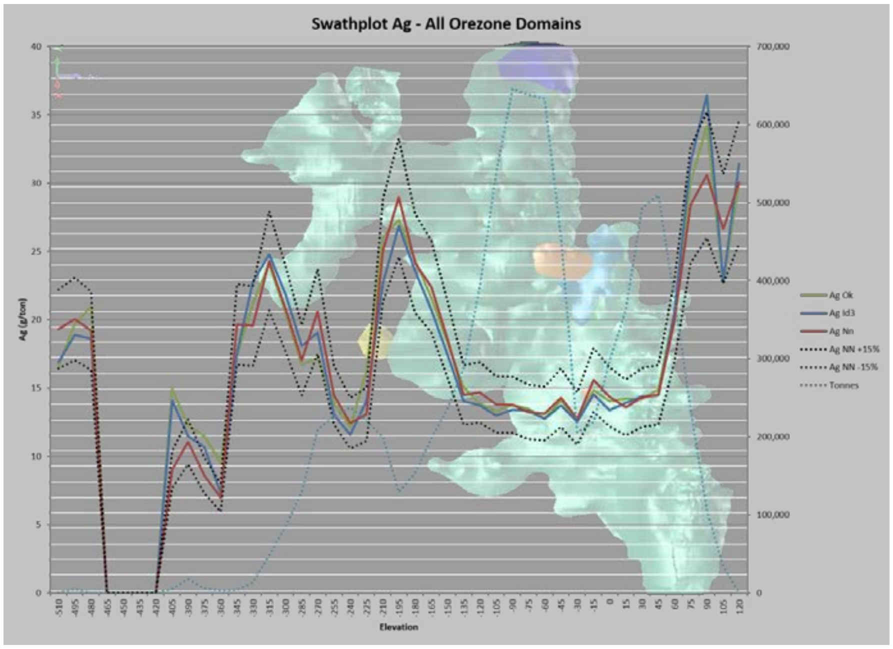


FIGURE 14-11 SWATH PLOT VALIDATION OF AG ESTIMATES BY ELEVATION – WF3



MINERAL RESOURCE ESTIMATE

Table 14-7 presents the Western Orefield 3 Mineral Resource estimate as at December 31, 2016.

TABLE 14-7 WF3 MINERAL RESOURCE ESTIMATE – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Class	Tonnes	Grade					Contained Metal (Tonnes)	
		Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)	Zn	Pb
Measured	1,511,260	10.68	0.88	16.15	0.34	9.77	161,360	13,220
Indicated	4,940,380	7.38	0.86	14.68	0.24	6.89	364,350	42,490
Measured + Indicated	**6,451,640**	**8.15**	**0.86**	**15.02**	**0.26**	**7.56**	**525,710**	**55,710**
Inferred	367,500	5.6	0.8	14.7	0.1	4.4	20,700	2,900

EASTERN OREFIELD

The Eastern Orefield (EOF) lens is located on Rosh Pinah Exclusive Prospecting License (EPL) 2616 within the mining grant area Mining License (ML) 39. It consists of the EF1 and EF2 lenses. The EF1 is the western limb of the EOF sheath fold, whilst, EF2 is the eastern limb.

DRILL HOLE DATABASE

A total of 1,178 production and 234 secondary exploration boreholes were drilled in EF1. Only 197 production and 105 secondary exploration holes were drilled in the EF2. During 2016 drilling was done on the -030 and -060 levels at EF1 and also at EF2 from the 180 to 130 level. The drilling target to upgrade resources between the -060 and -030 level at EF1 and at EF2 the 180 to 130 level from Indicated to Measured categories

A number of holes were excluded from the resource database:

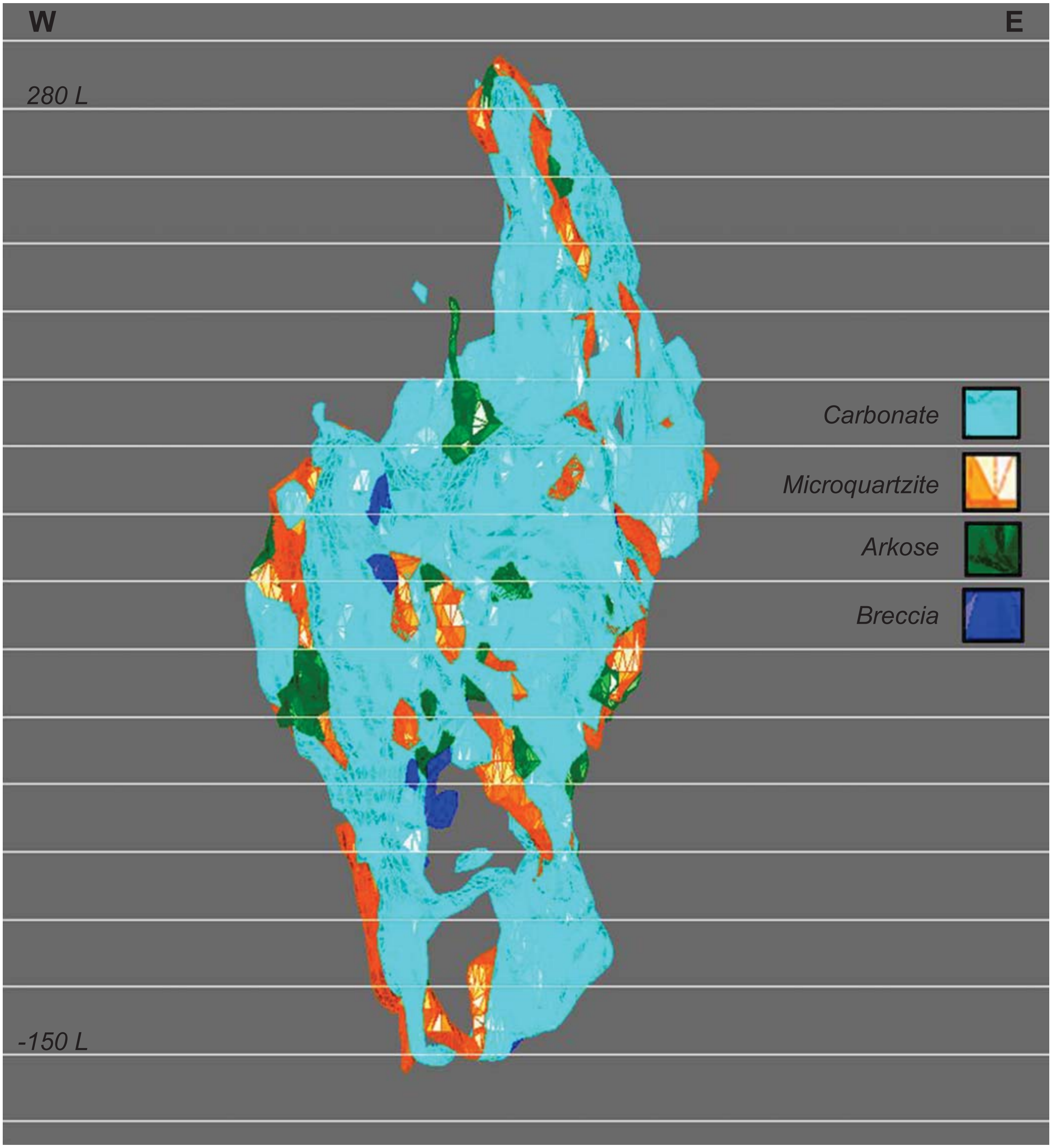
- A total of nine collars did not have surveyed or planned coordinates.
- A total of 17 boreholes were submitted to the laboratory but the results were not reported. Lithological intersections were, however, used for interpretations.
- Furthermore, a total of 70 boreholes were excluded from the dataset and interpretations due to these boreholes displaying conflicting geology or grade due to spurious borehole orientations. Other data used during lens modelling are the mapping information; the level maps for each lithology were triangulated and viewed in section view during section interpretations.

GEOLOGICAL MODEL

Carbonate mineralization is the dominant mineralization type, followed by microquartzite/argillite mineralization and minor arkose and arkose breccia mineralization (mostly hanging wall remobilization). The mineralization 4% Zn equivalent wireframe was modelled with Minesight. Figure 14-12 presents a view of the EOF geological model illustrating the mineralization types.

COMPOSITING

A composite length of 1.5 m was used. The composites were produced by “spearing” in MineSight software where the intersections inside the 4% Zn equivalent report were coded to the database and then extracted at a fixed 1.5 m length from contact to contact (footwall to hanging wall). At contacts, due to irregular lengths of intersection, a minimum 50% length is applied (0.75 m).



0 20 40 60 80 100
Metres

Figure 14-12

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Eastern Orefield Lithologies

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

TREATMENT OF HIGH GRADES (CAPPING)

The capping values are based on basic statistics from the composite data. Table 14-8 lists the capping values for EF1 and EF2.

TABLE 14-8 CAPPING VALUES BY DOMAIN - EOF
Trevali Mining Corporation – Rosh Pinah Mine

Element	EF1 Domain	EF2 Domain
Zn (%)	41.0	43.0
Pb (%)	12.50	12.40
Fe (%)	13.00	12.50
Cu (%)	1.85	0.97
Ag (g/t)	3.70	2.62
Mn (%)	none	5.00
Mg (%)	7.00	10.00
RD (%)	4.00	4.00

BLOCK MODEL

A MineSight block model was utilized with 5 m by 5 m by 5 m parent blocks which were that were sub- blocked into 2.5 m by 2.5 m by 2.5 m blocks.

BULK DENSITY

A bulk density of 3.0 t/m^3 was applied to all blocks.

SPATIAL ANALYSIS (VARIOGRAPHY)

The estimate was conducted on two separate domains: EOF1 and EOF2. The estimation parameters included variogram parameters and search ellipse ranges generated for each domain using MineSight.

BLOCK MODEL INTERPOLATION

The EOF model estimate was conducted using an OK estimation method in MineSight software.

MINERAL RESOURCE CLASSIFICATION

Measured Resources were classified for blocks located above the -60 level and Indicated Resources were assigned to blocks below the -90 level.

MINING DEPLETION

The EOF has been mined since 1999. The EF1 lens is mined out from the 270 to the 000 levels. EF2 consists of two separate stopes, between 280 and 210 levels and from 110 to 80 levels.

VALIDATION

The EOF model was validated in Excel by generating swathplots (Figures 14-13 and 14-14) plotted against the composited data. Visual validation versus the drill hole data was also performed for all elements. The estimate was validated as acceptable for all elements.

FIGURE 14-13 SWATH PLOT VALIDATION OF ZN ESTIMATES – EOF

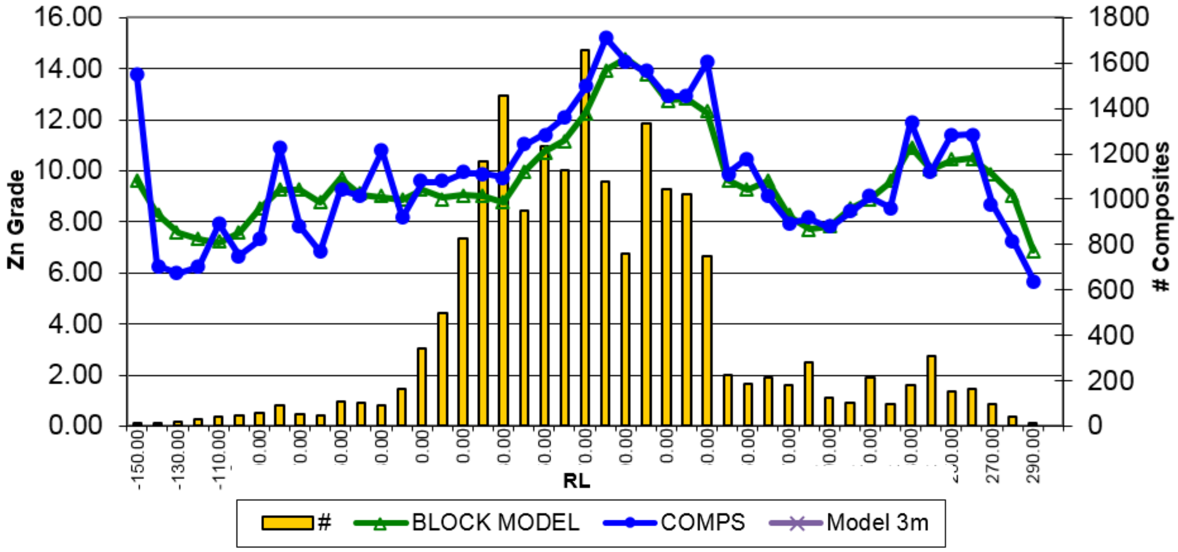
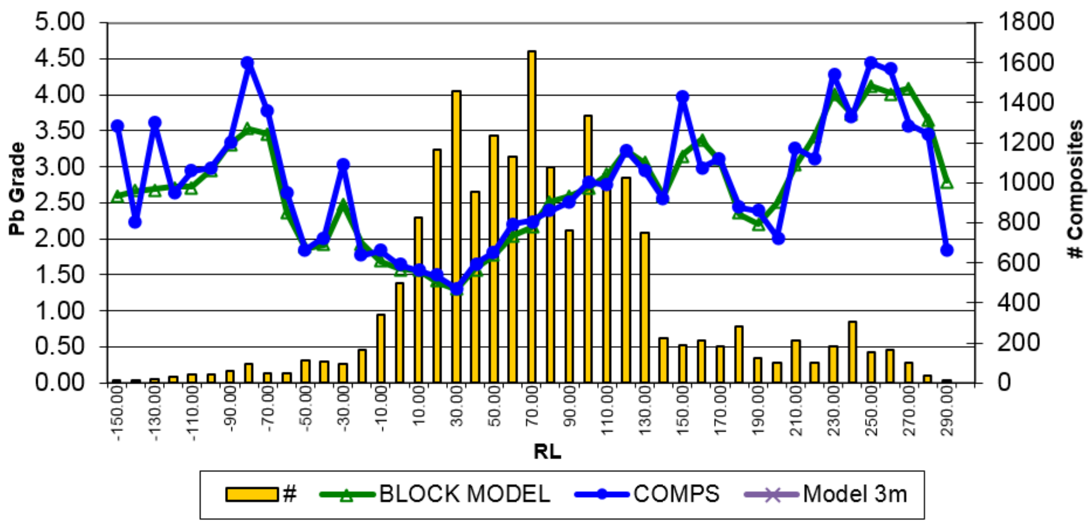


FIGURE 14-14 SWATH PLOT VALIDATION OF PB ESTIMATES – EOF



MINERAL RESOURCE ESTIMATE

Table 14-9 presents the EOF Mineral Resource estimate as at December 31, 2016.

TABLE 14-9 EOF MINERAL RESOURCE ESTIMATE – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Class	Tonnes	Grade					Contained Metal (Tonnes)	
		Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)	Zn	Pb
Measured	613,520	8.07	1.89	48.17	0.17	2.57	49,500	11,610
Indicated	673,740	8.83	3.24	76.73	0.21	2.08	59,480	21,810
Measured + Indicated	**1,287,260**	**8.47**	**2.60**	**63.11**	**0.19**	**2.31**	**108,980**	**33,420**
Inferred	-	-	-	-	-		-	-

SOUTHERN OREFIELD 1 – NORTH AND SOUTH

The Southern Orefield 1 (SOF1) is comprised of S1N (Southern Orefield 1 North) and S1S (Southern Orefield 1 South). The lens lies between sections -180 to -850 on all levels. In May 2016, the lens was estimated and modelled as one wireframe entity since it shows geological continuity. This discussion below is a compilation of historical reports on the two separate lenses with an update of the latest drilling and modelling results based on estimation parameters used for the combined wireframe.

DRILL HOLE DATABASE

The SOF1 drilling is carried out on the main geology grid. In October 2015, drilling took place on S1N/S1S to upgrade the 130 to 100 levels into the Measured category. Drilling was undertaken on sections -680 to -590 and -580 to -550. The results of this drilling campaign have been incorporated into the May 2016 estimate.

Drilling also took place in October 2016 to move sections -470 to -530 into the Measured category, however, this was not included in the current resource estimate. It has been noted that the lens becomes thinner and less economic below 110 level.

Some 22 drill holes were excluded from the interpretations due to a lack of survey information, or intersection orientation (e.g., drilled parallel to the strike of the lens), or because they were superseded by new drilling.

GEOLOGICAL MODEL

The S1N lens is interpreted as a tightly folded anticline in the upper portion and a synclinal structure in the lower portion. Figure 14-15 presents view of -570 Section. In orange is the SF1 fault to the west with the A-Mine shear to the east (pink). The black lines represent anticlinal traces.

The S1S lens is interpreted as a D2 fold, with the main portion of the S1S hosted in the eastern limb of a synclinal structure. Figure 14-16 presents (a) a view from SSW strike direction illustrating that the mineralization width varies from 2 m to 10 m on section from the 210 level downwards, and (b) a perpendicular section view illustrating that the mineralization thickness decreases at depth.

COMPOSITING

A composite length of 1.5 m was used.

TREATMENT OF HIGH GRADES (CAPPING)

No grade capping was applied for zinc and copper. The capping procedures for the other elements are unknown.

BLOCK MODEL

A MineSight block model was utilized with 5 m by 5 m by 5 m parent blocks which were then sub-blocked into 2.5 m by 2.5 m by 2.5 m blocks.

BULK DENSITY

No information on bulk density was provided.

SPATIAL ANALYSIS (VARIOGRAPHY) AND INTERPOLATION

Zinc, lead, iron, copper, and silver showed good variography and OK was used to generate the estimate for these elements. Geostatistics showed very poor variography in Mn and Mg composite data. High ranges and erratic sills were noted, not trending to 1. Therefore, ID^3 was used to estimate these two elements.

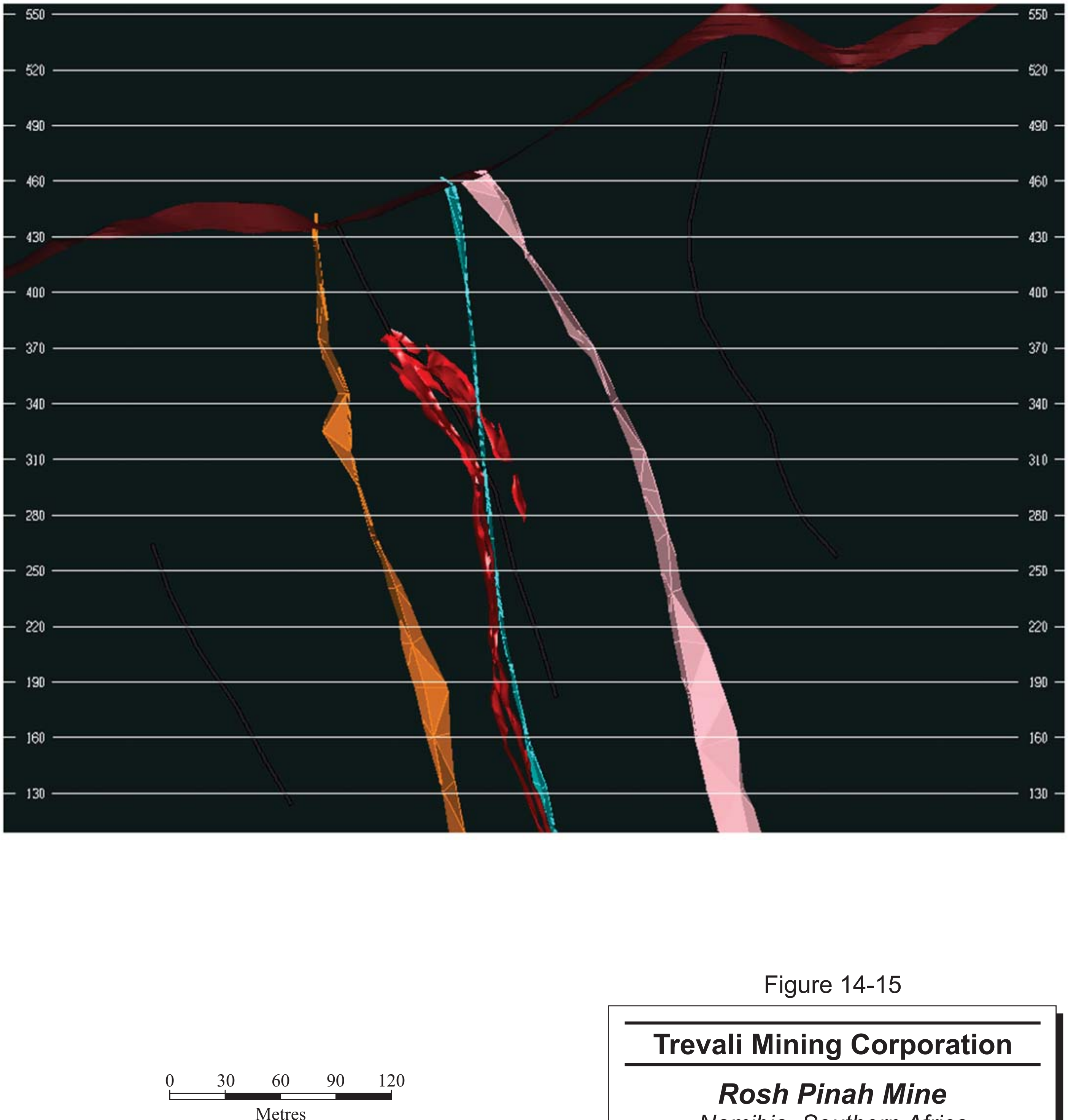


Figure 14-15

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

-570 Section
S1N Lens Interpretation

April 2017

Source: RPA, 2017.

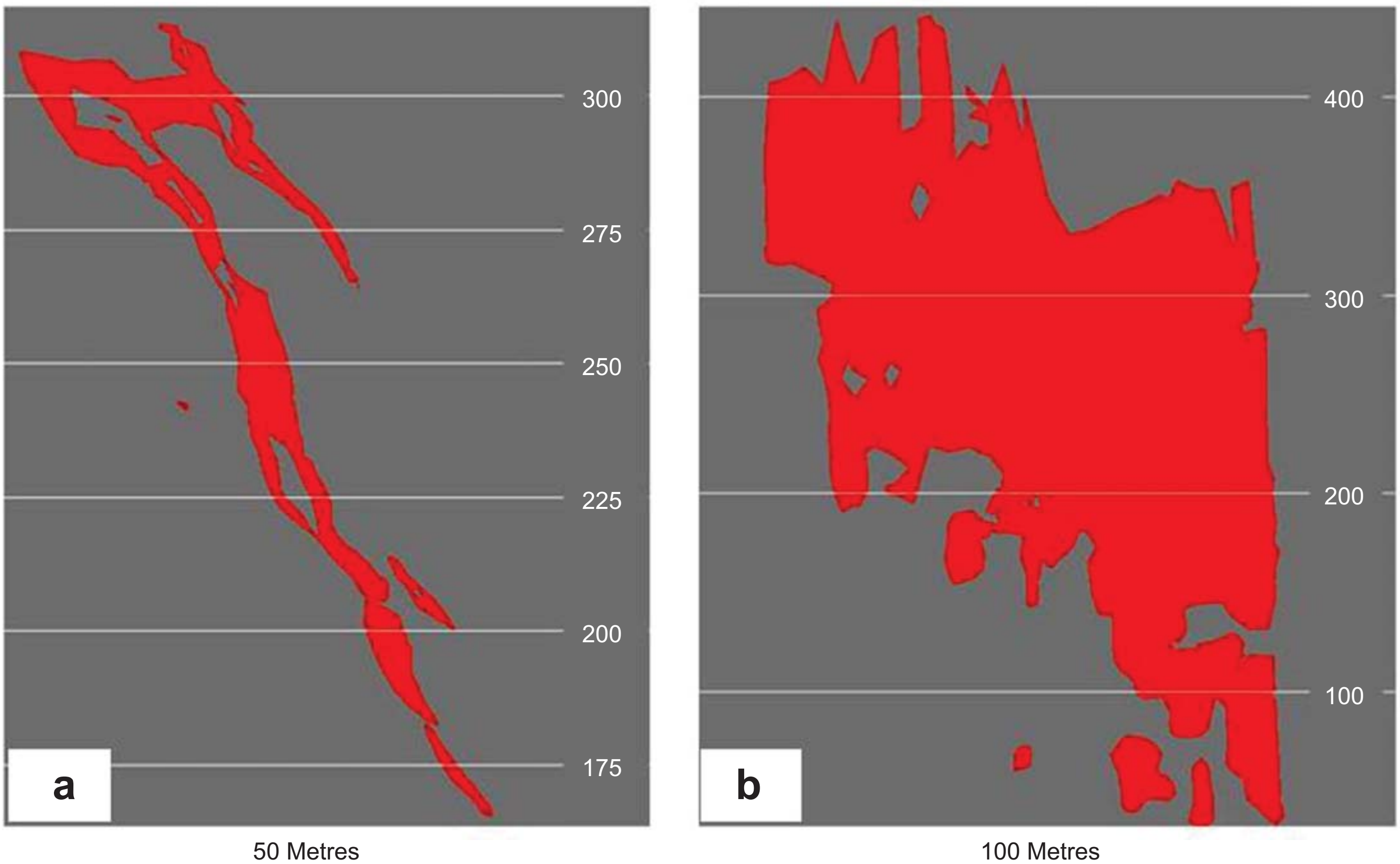


Figure 14-16

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

S1S Lens Interpretation

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

MINERAL RESOURCE CLASSIFICATION

Mineral Resources were classified by section and level based on drill spacing: 10 m for Measured, 30 m for Indicated, and 60 m for Inferred classification.

Measured:

- S1N: Section -180 to -580: > 110 to < 340 levels
- S1S: Section -580 to -850: 110 to < 225 levels

Indicated:

- S1N: Section -180 to -580: < 110 level
- S1S: Section -580 to -850: <110 level

MINING DEPLETION

The lens is mined out from 400 level to 150 level. These areas were depleted prior to reporting.

VALIDATION

The SOF model was validated using swath plots in Excel for all minerals. The estimate appears acceptable for most elements (Figures 14-17 to 14-21), however, it is noted that Zn and Fe appear to be slightly overestimated.

FIGURE 14-17 SWATH PLOT OF VALIDATION OF ZN ESTIMATES – SOF1

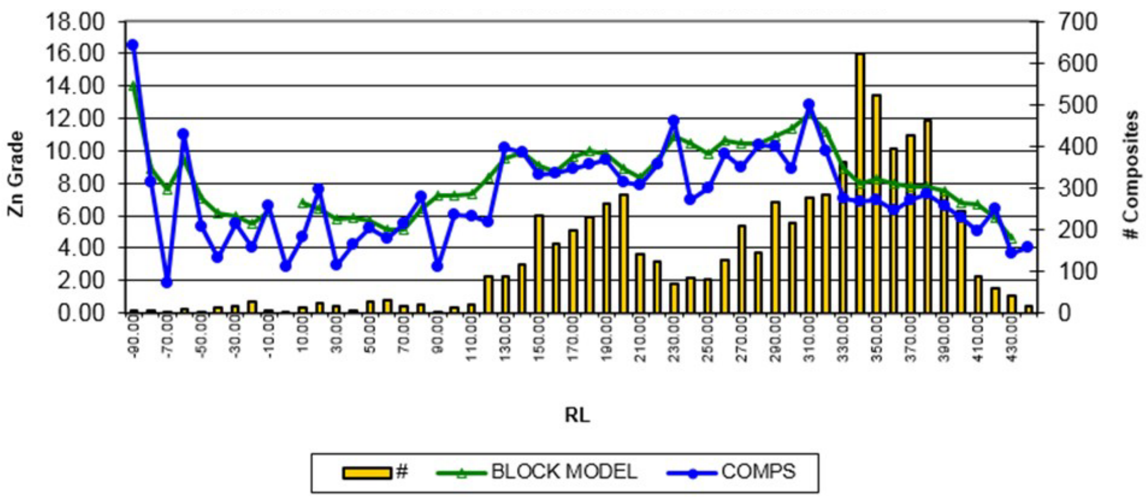


FIGURE 14-18 SWATH PLOT OF VALIDATION OF PB ESTIMATES – SOF1

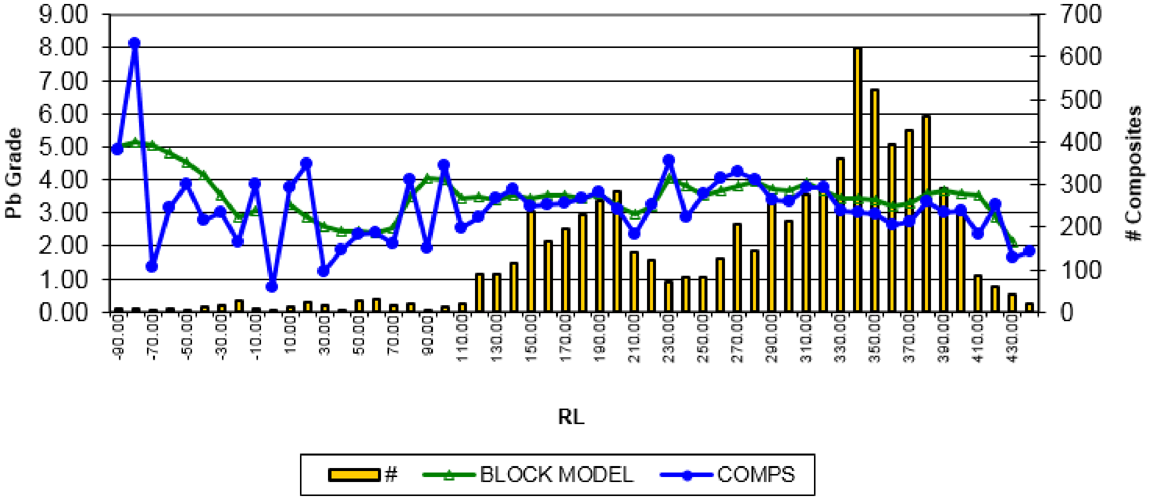


FIGURE 14-19 SWATH PLOT OF VALIDATION OF CU ESTIMATES – SOF1

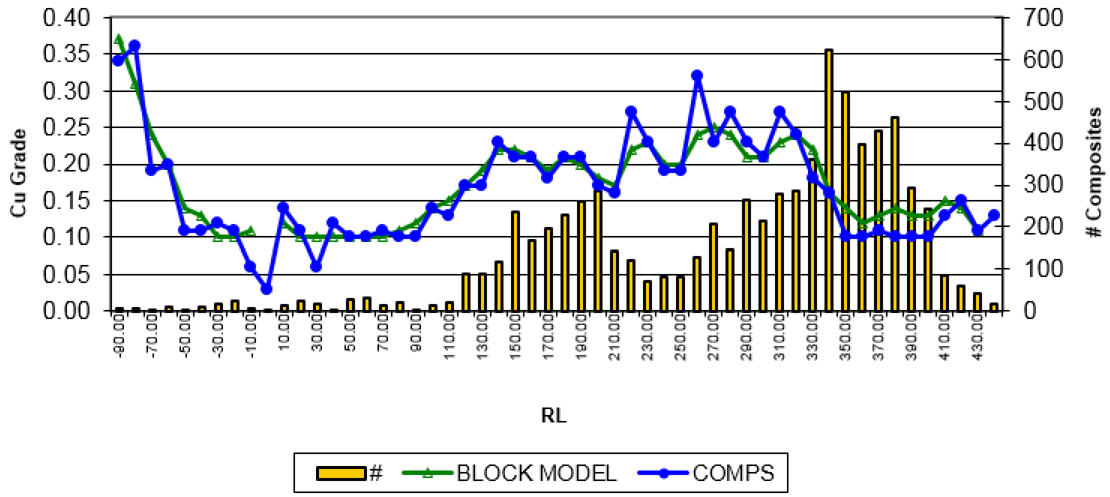


FIGURE 14-20 SWATH PLOT OF VALIDATION OF AG ESTIMATES – SOF1

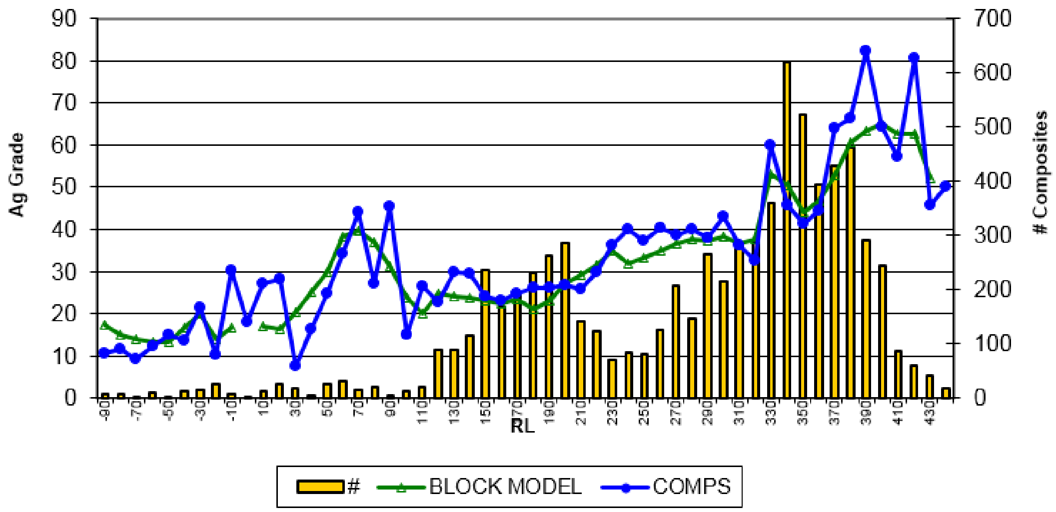
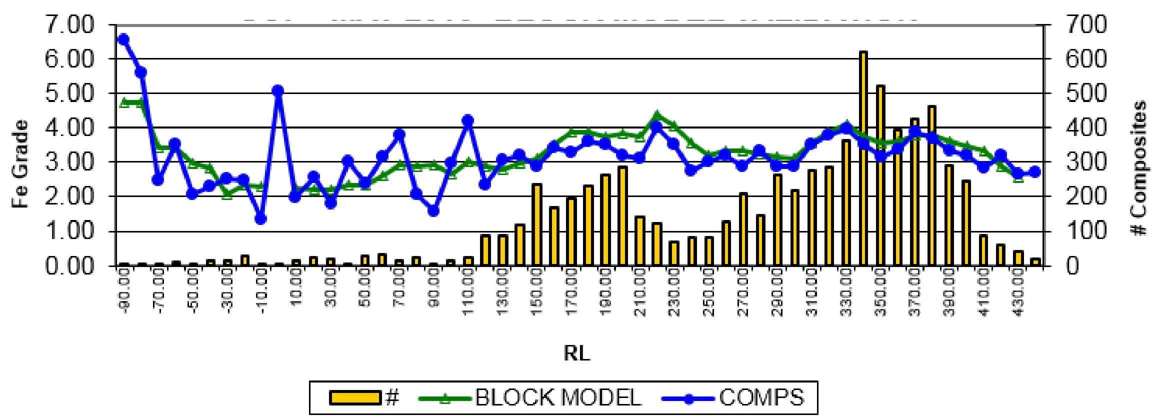


FIGURE 14-21 SWATH PLOT OF VALIDATION OF FE ESTIMATES – SOF1



MINERAL RESOURCE ESTIMATE

Table 14-10 presents the SOF1 Mineral Resource estimate as at December 31, 2016.

TABLE 14-10 SOF1 (S1N AND S1S) MINERAL RESOURCE ESTIMATE – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Class	Tonnes	Grade					Contained Metal (Tonnes)	
		Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)	Zn	Pb
S1N Measured	287,080	8.34	2.76	28.45	0.13	3.80	23,940	7,920
S1S Measured	57,980	9.32	4.70	41.03	0.23	3.47	5,400	2,730
Total Measured	**345,060**	**8.50**	**3.09**	**30.6**	**0.15**	**3.74**	**29,340**	**10,650**
S1N Indicated	193,110	7.42	3.51	18.33	0.14	2.62	14,330	6,780
S1S Indicated	36,080	4.83	2.76	43.96	0.10	2.59	1,740	1,000
Total Indicated	**229,190**	**7.01**	**3.39**	**22.36**	**0.13**	**2.62**	**16,070**	**7,780**

SOUTHERN OREFIELD 3

The Southern Orefield 3 (SF3) is located in the southwestern part of the mine. The lens is between -480 to -720 sections and 310 and -050 levels.

DRILL HOLE DATABASE

Drilling in SF3 is carried out on the main geology grid. The drilling campaign in 2016 was conducted from 80 level on sections -540 to -620. This campaign consisted of 2,000 m of drilling in order to upgrade resources between the 080 and 050 levels into the Measured category.

A total of 21 boreholes were excluded from interpretation and estimation, due to conflicting geological information. Shorter and more recent holes were given preference.

GEOLOGICAL MODEL

Figure 14-22 presents a view of the lithology distribution of SF3.

COMPOSITING

A composite length of 1.5 m was used.

TREATMENT OF HIGH GRADES (CAPPING)

The capping procedures are unknown; however, it does appear that the grades have been cut.

BLOCK MODEL

A MineSight block model was utilized with 5 m by 5 m by 5 m parent blocks which were then sub- blocked into 0.625 m by 0.625 m by 0.625 m blocks.

BULK DENSITY

A bulk density of 3.0 t/m^3 was applied to all blocks.

SPATIAL ANALYSIS (VARIOGRAPHY)

Variography analysis generated variogram parameters for each element that was interpolated.

BLOCK MODEL INTERPOLATION

The estimate was conducted in November 2016 using OK for zinc, lead, and iron. ID^3 was used for the other major elements including copper, magnesium, and silver.

MINERAL RESOURCE CLASSIFICATION

Mineral Resources were classified based on drill spacing: 10 m for Measured, 30 m for Indicated, and 60 m for Inferred classification.

MINING DEPLETION

Approximately 400,000 t have been mined out. All material above 170 level has been mined out or is deemed too narrow to mine.

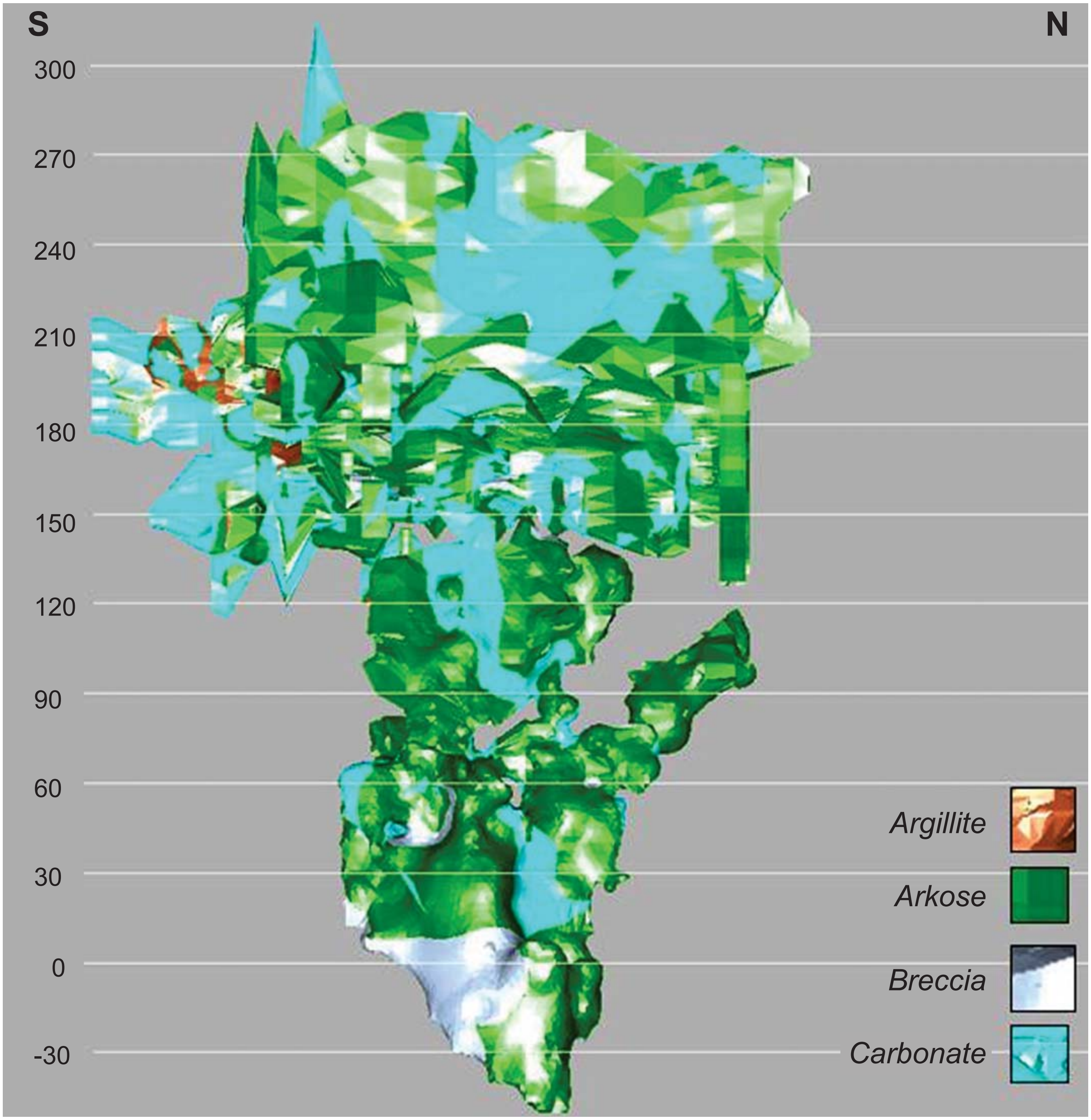


Figure 14-22

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Lithology Distribution - SF3

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

VALIDATION

The model was validated for all minerals using swathplots (Figure 14-23 and 14-24) and visual validation of block grades versus the drill hole information. The validation was deemed acceptable for all elements.

FIGURE 14-23 SWATH PLOT VALIDATION OF ZN ESTIMATES – SF3

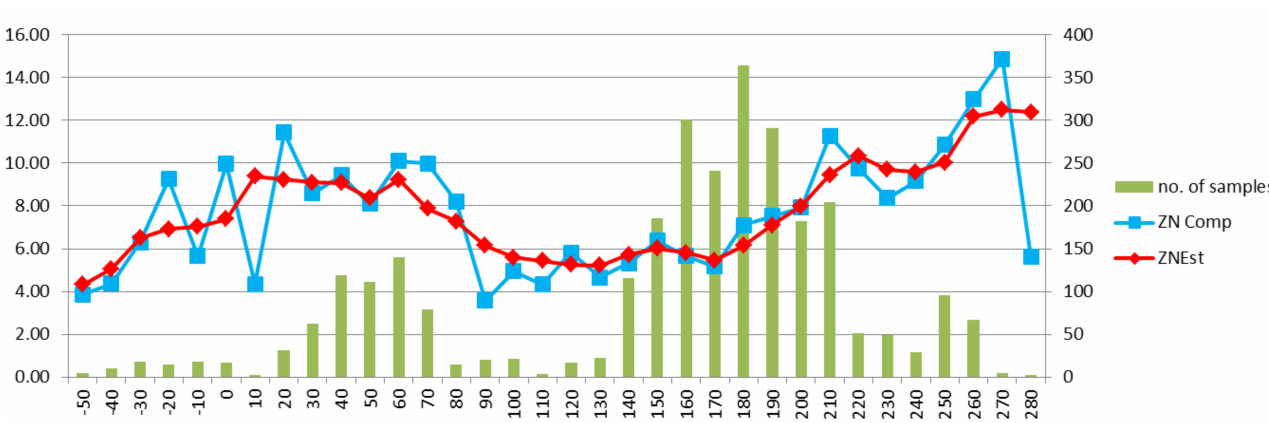
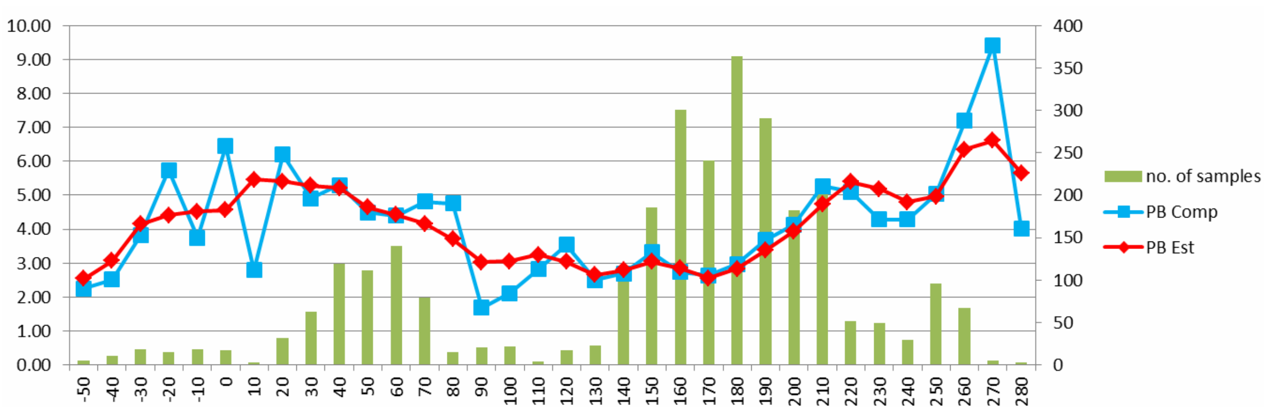


FIGURE 14-24 SWATH PLOT VALIDATION OF PB ESTIMATES – SF3



MINERAL RESOURCE ESTIMATE

Table 14-11 presents the SOF3 Mineral Resource estimate as at December 31, 2016.

TABLE 14-11 SF3 MINERAL RESOURCE ESTIMATE – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

		Grade					Contained Metal (Tonnes)	
Class	**Tonnes**	**Zn (%)**	**Pb (%)**	**Ag (g/t)**	**Cu (%)**	**Fe (%)**	**Zn**	**Pb**
Measured	266,820	5.99	2.81	24.40	0.16	12.05	15,980	7,500
Indicated	418,300	7.43	4.40	23.19	0.40	4.87	31,080	18,410
Measured + Indicated	**685,120**	**6.87**	**3.78**	**23.66**	**0.31**	**7.67**	**47,060**	**25,910**
Inferred	-	-	-	-	-		-	-

SECONDARY LENSES

Mineral Resources have also been estimated for a number of Secondary Lenses (Table 14-12) as at December 31, 2016.

The secondary Measured and Indicated Mineral Resources, which have not been subsequently been converted to Mineral Reserves, are located within existing infrastructure and are well drilled. The Measured and Indicated Mineral Resources are located in secondary lenses that have previously been mined.

Also included in this category are two larger Inferred Mineral Resources, namely the WF4 Extension and the AAB lens. These lenses will undergo further exploration drilling in order to potentially upgrade the Mineral Resource classification.

In general, the Mineral Resource estimation techniques for the Secondary Lenses followed the standard methodology as presented in detail in the Primary Lenses section.

TABLE 14-12 ROSH PINAH SECONDARY MINERAL RESOURCES – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Zone	Code	Class	Description	Tonnes	Grades				
					Zn (%)	Pb (%)	Ag (g/t)	Cu (%)	Fe (%)
Northern Orefield	NCM	Measured	North of C Mine: Section +530 to +630: 395 to < 425 Level	53,900	4.12	0.79	32.71	0.04	3.46
	NF3	Indicated	A. Mine No. 2: <140 Level: -730 to -870	146,640	5.32	1.57	47.63	0.05	3.97
B Mine	BME	Measured	B. MINE East: Section -60 to -270: 310 to 360 Level	212,000	4.39	1.42	39.66	0.04	3.03
	BME	Indicated	B. MINE East: Section -60 to -270 280 to < 310 Level	35,020	4.36	1.52	48.47	0.05	3.19
Western Orefield Others	WF1	Measured	Western Orefield No. 1: O/S (Crown Pillar) Section +90 to -300: 256 to 355 Level	134,620	8.20	2.82	35.00	0.15	2.99
	WF2	Measured	Western Orefield No. 2: O/S (Extrusion) Section +90 to -300: 100 to <256 level	154,800	6.50	2.41	14.50	0.07	3.48
	WF4	Measured	Western Orefield No. 4: Section -30 to -150: 0 to < 65 Level	21,140	5.66	3.58	23.73	0.10	4.98
	WF4_EXT	Inferred	Western Orefield No 4 Ext: Section +30 to -180 <80 Level & > -120 Level	1,197,500	5.9	0.5	12.4	0.1	6.8
A Mine	AM1	Inferred	A. MINE No. 1: B+20 to H+20 (-620 to -750) and -590 to -720: <150 Level	12,000	9.0	1.9	37.00	0.1	3.7
	AME	Measured	A. MINE East: Section -590 to -720: 150 to <180 Level	31,550	7.39	0.90	37.42	0.09	4.41
	AME	Inferred	A. MINE EAST: Section: -590 to -720 <150 Level	4,300	6.4	1.6	59.8	0.1	3.7
	AM2	Measured	A. MINE No. 2: Section -720 to -870: 140 to <155 Level	7,760	6.85	3.12	99.25	0.15	3.58
	AAB	Inferred	Lower Levels AME_AM2_BAE: Section -600 to -910: <280 to >-375 Level	1,347,900	6.1	1.7	49.7	0.1	3.2
Between A Mine and EOF	BAE	Indicated	BAE: Section BAE -60 to BAE +70 (MGG -860 to -980: -45 to < 200 Levels	144,890	5.07	0.96	15.66	0.04	4.55

15 MINERAL RESERVE ESTIMATE

SUMMARY

As at December 31, 2016, Proven and Probable Mineral Reserves at Rosh Pinah as audited by RPA total 5.1 Mt grading 8.8% Zn, 1.5% Pb, and 21 g/t Ag (Table 15-1). RPA is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

TABLE 15-1 MINERAL RESERVE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Classification	Tonnes (M)	Grade Zn (%)	Grade Pb (%)	Grade Ag (g/t)	Contained Metal (Tonnes) Zn	Contained Metal (Tonnes) Pb
Proven	1.61	9.88	1.01	17.19	159,100	16,300
Probable	3.47	8.29	1.65	22.32	287,700	57,200
Proven and Probable	**5.08**	**8.78**	**1.45**	**20.75**	**446,700**	**73,500**

Notes:
1. CIM definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at various NSR cut-off values depending on required development.
3. Mineral Reserves are estimated using average consensus forecast long-term prices of US$1.03/lb Zn, US$0.93/lb Pb, US$18.65/oz Ag and US$1,358/oz Au at an exchange rate of 17.71 NAD/US$.
4. Shown at 100% ownership.
5. Numbers may not add due to rounding.

Mineral Reserves are estimated from the Measured and Indicated Mineral Resources. RPA has performed an independent verification of the block model tonnes and grade, and in RPA's opinion, the process is done to industry standards.

The Mineral Reserve estimation at RPZC has been completed by the Project Mining Engineer who has sufficient Long Term Planning experience and is reviewed by the Glencore Zinc Technical Services Team.

During 2016, a series of changes were made to the geological resource due to increased drilling density and improved information increasing the confidence of the resource block model.

The 2016 Mineral Reserve estimation followed a new strategy as compared to previous years. This was primarily driven by a change in methodology and was supported by a new Software suite from Datamine. The approach entailed using Mineable Stope Optimizer (MSO) to determine an array of potential minable stope shapes per level based on a selection of cut-off grades as determined using a Basic Mining Equation (BME).

The resulting MSO stope shapes are compared to each other and ranked to identify which stopes should be used for further design refinement from which the final Mineral Reserve estimate would be derived.

The following is the sequence for estimating the Mineral Reserves:

1. BME
    - Cut-off for areas already fully or partially developed
    - Mill Cut-off for areas already fully or partially developed
    - Cut-off for areas that require development
    - Mill Cut-off for areas that require development
2. MSO stope shape runs per level per relevant cut-off grade range
3. MSO ranking and selection of stope shapes
4. Design refinement
5. Reserve reporting.

The BME captures the full cost of the mining operation including mining, processing, shipping, and smelting costs. The BME considers the following modifying factors, some of which are applied in the NSR calculation and others in the cut-off cost of production.

- Mining
    - Dilution – applied to tonnes and grade
    - Mining recovery – applied to tonnes
- Processing
    - Upgrade – applied in NSR formula
    - Mass pull - applied in NSR formula
    - Recovery - applied in NSR formula
- Financial
    - Macro economics such as:
        - Exchange rate – applied in NSR formula and to costs
        - Metal prices - applied in NSR formula

- Micro economics
  - Opex
  - On site – applied to cut-off costs
  - Off site – applied in NSR formula
  - Capex – applied to cut-off costs

MINING MODIFYING FACTORS

An approach to include mining dilution and mining recovery per phase of mining has been adopted. This is especially relevant in the WF3 orebody where mining commenced in November 2016. From previous mining experience and through geotechnical investigations, the inclusion of a realistic dilution and mining recovery value has been adopted going forward to determine the Mineral Reserve tonnes and grade.

A dilution factor of 3.9% is applied to the zinc grade for all orebodies. A dilution factor of 6.9% is applied to the lead grade for all orebodies and a dilution factor 0f 10.8% is applied to the silver grade for all orebodies.

The SOF, EOF, and SF3 orebodies are all considered to be phase 1 mining and have had dilution included at 15%. A 94% recovery value has been set for these orebodies.

The WF3 orebody has been divided into three phases of mining with dilution for phase 1 and phase 2 set at 15% and dilution for phase 3 set at 20%. The phase 1 recovery value for the WF3 orebody is 94%, while the phase 2 recovery value is 84% and the phase 3 recovery value is 55%.

The majority of Mineral Reserves are in the WF3 orebody, which is more mineralogically and geotechnically complex than previously mined zones (Table 15-2).

TABLE 15-2 PROVEN AND PROBABLE MINERAL RESERVES BY OREBODY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Rosh Pinah Mine

Orebody	Tonnes (M)	Zn (%)	Pb (%)	Ag (g/t)
SOF	0.35	5.93	2.42	13.10
EOF	0.75	7.97	2.58	61.36
SF3	0.39	6.64	3.77	19.95
WF3	3.59	9.44	0.92	13.73
Total	**5.08**	**8.78**	**1.45**	**20.75**

Notes:
1. CIM definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at various NSR cut-off values depending on required development.
3. Mineral Reserves are estimated using average consensus forecast long-term prices of US$1.03/lb Zn, US$0.93/lb Pb, US$18.65/oz Ag and US$1,358/oz Au at an exchange rate of 17.71 NAD/US$.
4. Shown at 100% ownership.
5. Numbers may not add due to rounding.

PLANT MODIFYING FACTORS

The processing plant at RPZC is an upgrade plant that produces two concentrate products, namely, zinc and lead. Varying factors such as rock type, grade, impurities, and grade blend all contribute to the achievable recovery of metal and the grade of the concentrate product.

FINANCIAL MODIFYING FACTORS

The metal price assumptions are based on the average price for the next five years. This period corresponds with the mine operating at full capacity. Beyond year six, the mine production slows prior to ceasing in 2023.

The average operating cost, excluding capital, is $45.90 per tonne. This costs increases to $78.00 per tonne with the inclusion of sustaining capital costs for the underground operation.

Mining and processing costs used for the Mineral Reserve cut-off calculations have been extracted directly from the 660,000 tpa mining budget physicals prepared in mid-2016. The values are based on the average costs for the next five years (2017-2021) representing the mine operating at a nameplate capacity of 660,000 tpa out to the end of mine life, with exception of the tail end.

The costs include:

- All subsequent capital development costs
- All operating costs (mining, on-site crushing, ore transport to mill and milling)
- All resource delineation and grade control costs

MINING REVENUE

Revenue of any given parcel of material is calculated using an NSR equation. NSR is the net revenue received by the mine from the sale of the zinc, lead, and silver metal less transportation and processing costs.

The NSR equation takes all the latest financial and recovery information to generate a single revenue dollar figure for any particular grade combination found in the mine. The calculation uses assumptions for metal prices, current concentrator recoveries and budgeted downstream transport and realization costs.

The NSR value for the various metals are:

- $10.94/% Zn
- $8.44/% Pb
- $0.24/g Ag
- $12.55/g Au

The purpose for calculating the varying cut-off values for each of the scenarios listed was to enable a more robust MSO approach that could use each cut-off value as a scenario run that in turn could be validated based on its probability, amount of reserves created and mineability.

The equation is applied throughout the geological model to populate a NSR field for each individual block.

NSR cut-off values were determined for the following potential scenarios:

- Cut-off for areas already fully or partially developed
- Mill cut-off for areas already fully or partially developed
- Cut-off for areas that require development
- Mill cut-off for areas that require development

The purpose for calculating the varying NSR cut-off values for each of the scenarios listed was to enable a more robust MSO approach that could use each NSR cut-off value as a scenario run that in turn could be validated based on its profitability, amount of reserves created and mineability.

For the areas where full development is not required the following NSR cut-off values were used; $30/t, $45/t, $50/t, and $55/t. For the areas where full development is required the following higher NSR cut-off values were used; $55/t, $65/t, and $75/t. The calculated values have been summarized in Table 15-3.

TABLE 15-3 CUT-OFF VALUES FOR SPECIFIC SCENARIOS
Trevali Mining Corporation – Rosh Pinah Mine

Description	Unit	Model Name	Value 2017	Value 2018+	Scenario
Insitu Zn	%	ZN	4.05	4.36	Full level development not required
Diluted Zn Cut-off	%	ZNDIL	3.9	4.2	
Zinc Equivalent	%	ZNEQV	5.46	6.4	
NSR Value	US$/t	NSR	$47.00	$56.00	
Insitu Zn	%	ZN	1.41	1.59	Mill cut-off and full level development not required
Diluted Zn Cut-off	%	ZNDIL	1.36	1.53	
Zinc Equivalent	%	ZNEQV	3.19	4.13	
NSR Value	US$/t	NSR	$24.00	$31.00	
Insitu Zn	%	ZN	7.21	7.19	Full level development is required
Diluted Zn Cut-off	%	ZNDIL	6.94	6.92	
Zinc Equivalent	%	ZNEQV	8.34	8.92	
NSR Value	US$/t	NSR	$80.00	$86.00	
Insitu Zn	%	ZN	4.99	4.83	Mill cut-off and full level development is required
Diluted Zn Cut-off	%	ZNDIL	4.8	4.65	
Zinc Equivalent	%	ZNEQV	6.31	6.81	
NSR Value	US$/t	NSR	$57.00	$60.00	

RPA is of the opinion that the NSR cut-off values used for Mineral Reserve estimation are acceptable.

16 MINING METHODS

The Rosh Pinah mine has been in continuous operation since 1969. Underground mining methods are well established. The mine's orebodies are accessed via multiple declines. All mining is mechanized using drill rigs, scooptrams, and underground haulage trucks. Waste is hauled via declines to a surface waste dump or is placed in mined out stopes, where possible. Ore is dumped into an ore pass feeding a grizzly and primary crusher and is subsequently conveyed to the surface process plant.

Annual production is typically 600,000 t to 700,000 t of ore and this is met by three different mining areas supplying a blend of ore types to the concentrator. The blending is carried out to manage the levels of copper, manganese, and iron which detrimentally impact recovery of zinc and lead, as well as to maintain a constant zinc and lead grade feed.

The Rosh Pinah mine is comprised primarily of three groups of orebodies, namely the EF1 SF3, and WF3. The WF3 orebody contains harder ore, due to a higher proportion of microquartzite ore, which impacts processing rates, therefore going forward, this needs to be managed more closely. An isometric view and plan view of the orebody locations is shown in Figures 16-1 and 16-2.

Mining is predominantly by sub-level open stoping, with a small section of the mine being mined using a modified-room-and-pillar method due to a flatter dip. Ore development level spacing for open stoping is between 15 m and 30 m depending on the ore thickness with drive width dimensions of 6 m wide and 4.5 m high. The drive dimensions are being reduced to 5 m wide by 4.5 m high as part of a Business Improvement initiative designed to reduce costs. Figure 16-3 is a typical mining level in the WF3 orebody.

Blast holes (76 mm) for stoping are drilled from lower levels in a fan pattern using Atlas Copco Simba drill rigs (Figure 16-4). The burden is 1.9 m and toe spacing is 2.8 m. Emulsion explosives are used. Slot raises for stopes are drilled using an in-the-hole (ITH) drill and are drop-raised, where possible. Extraction of stopes starts on the upper levels and proceeds down dip (Figure 16-5). No backfill is used in the mine and sill or rib pillars are left where required for geomechanical purposes.

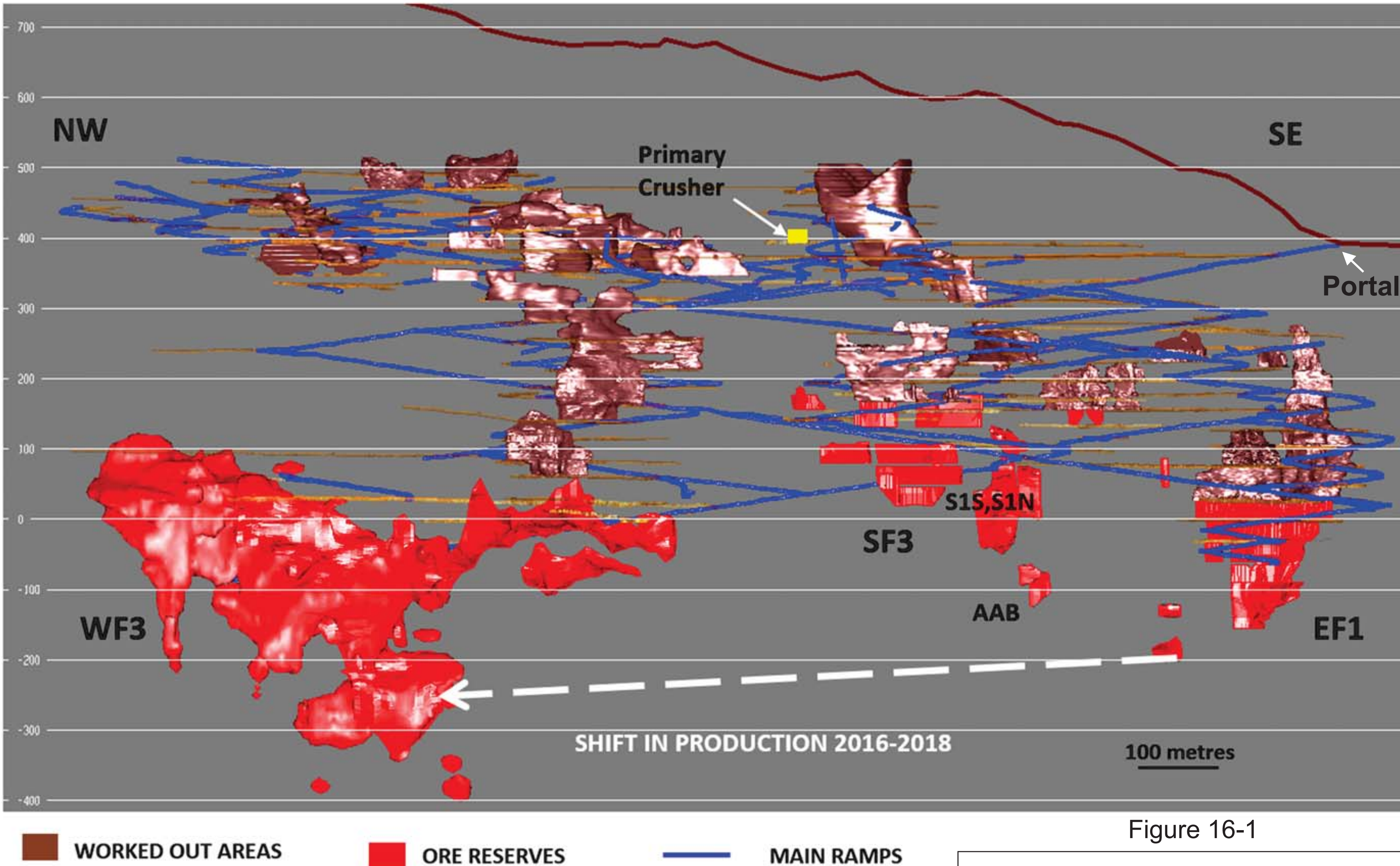


Figure 16-1

Trevali Mining Corporation

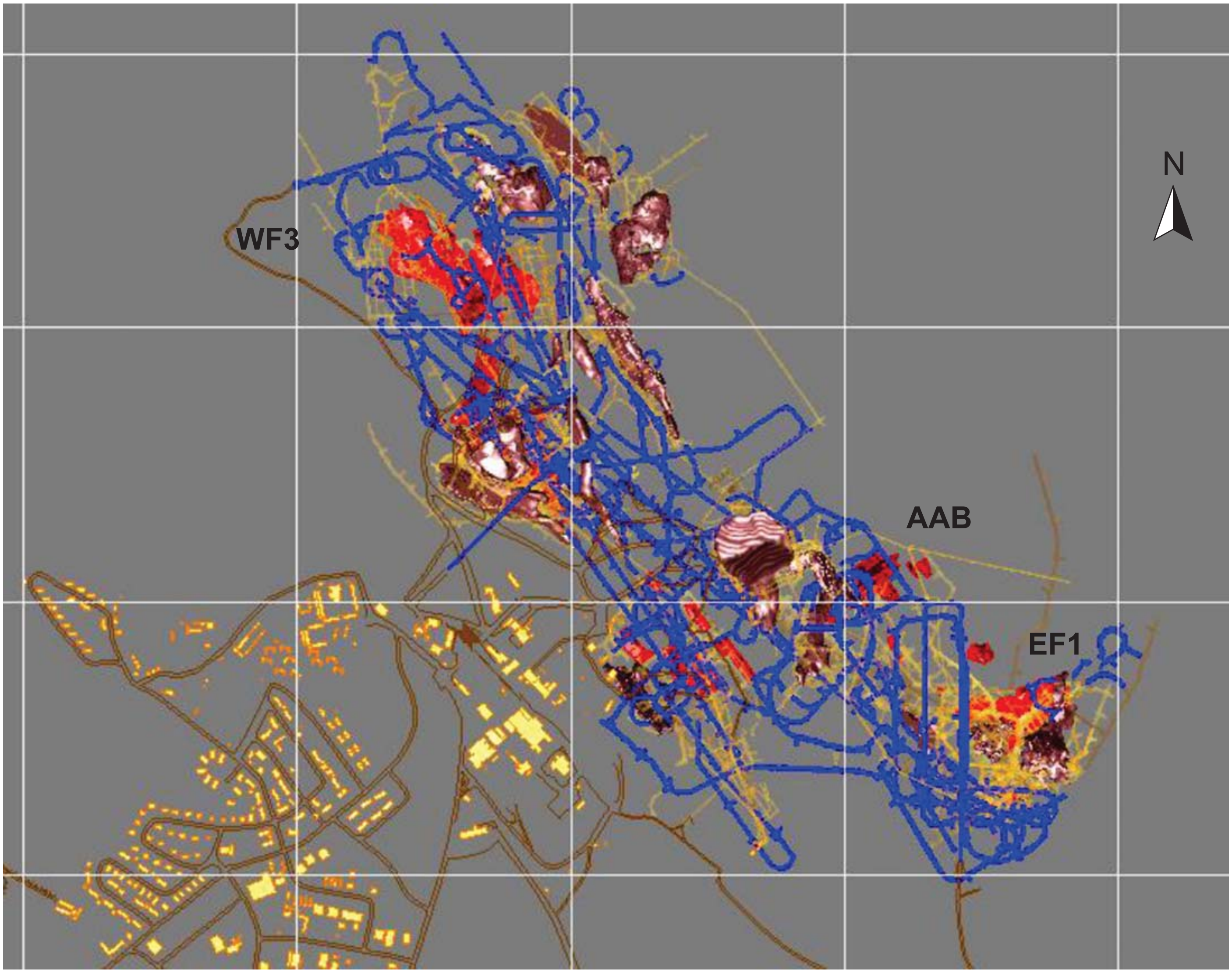
Rosh Pinah Mine

Namibia, Southern Africa

Isometric Mine Plan

April 2017

Source: Rosh Pinah Zinc Corp., 2016.



Legend:
- Worked Out Areas
- Ore Reserves
- Main Ramps

0 100 200 300 400 500
Metres

Figure 16-2

Trevali Mining Corporation

Rosh Pinah Mine
Namibia, Southern Africa
Mine Plan

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

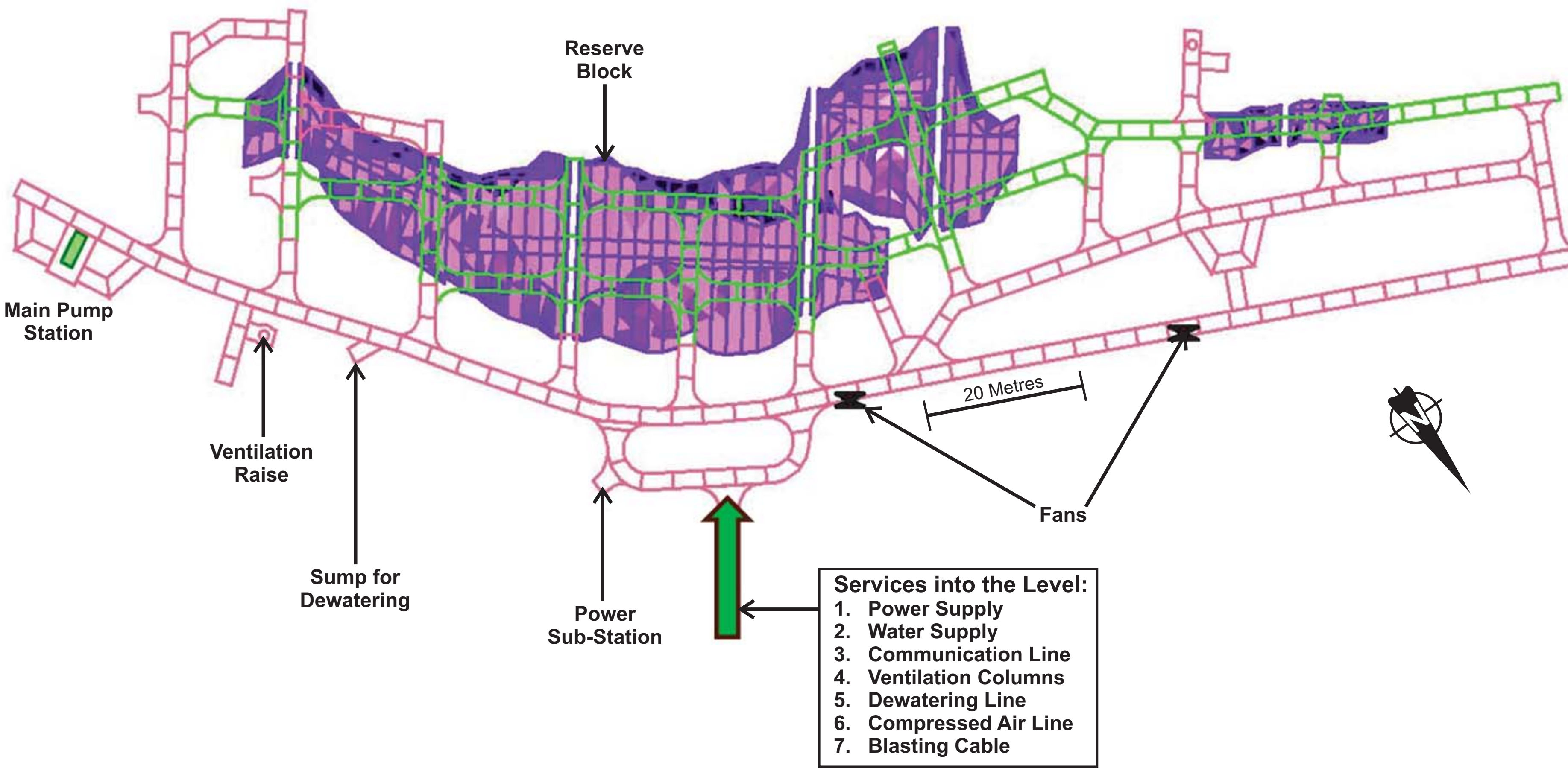


Figure 16-3

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Typical Mining Level
WF3 Orebody -60 Level

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

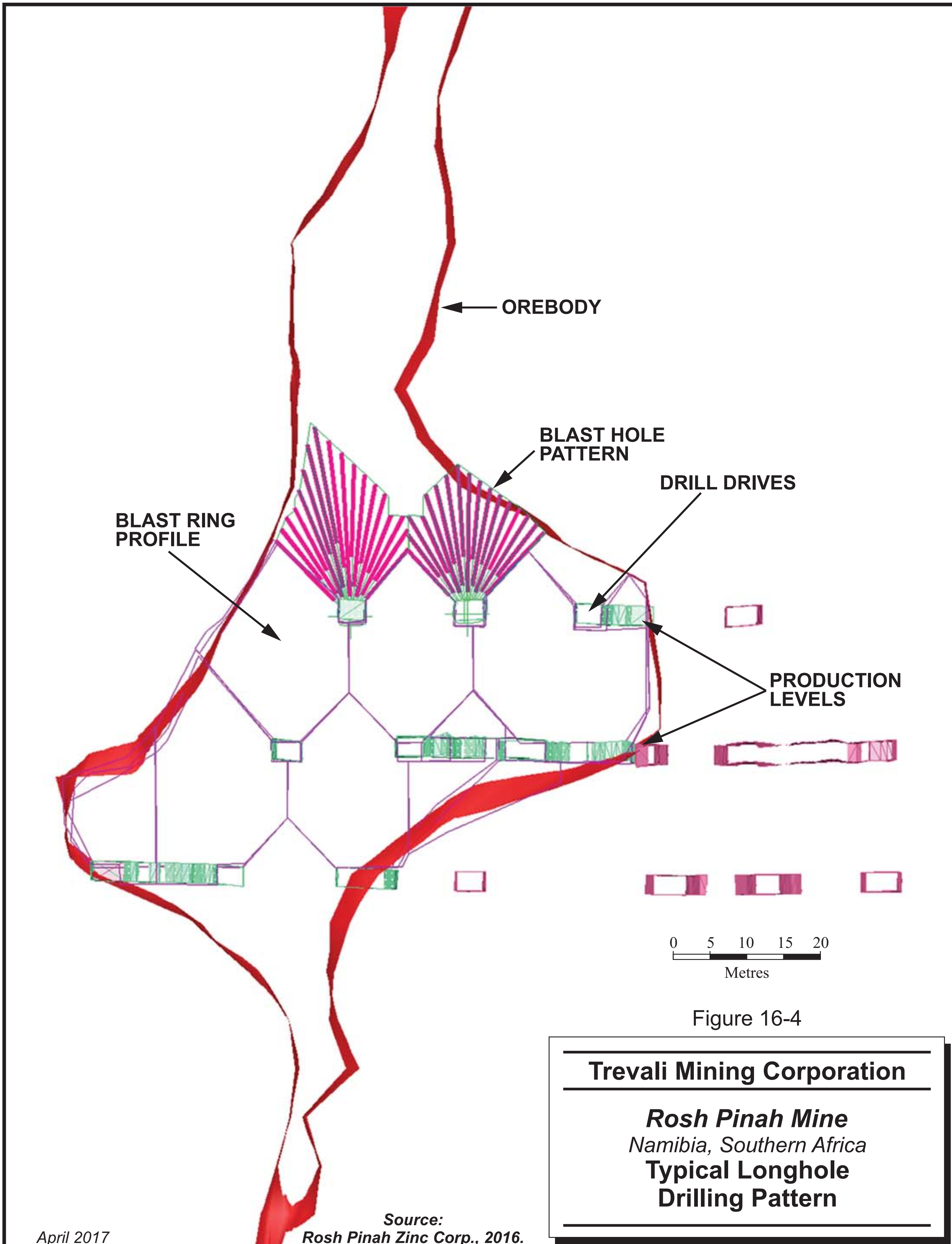


Figure 16-4

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Typical Longhole Drilling Pattern

April 2017

Source:* *Rosh Pinah Zinc Corp., 2016.

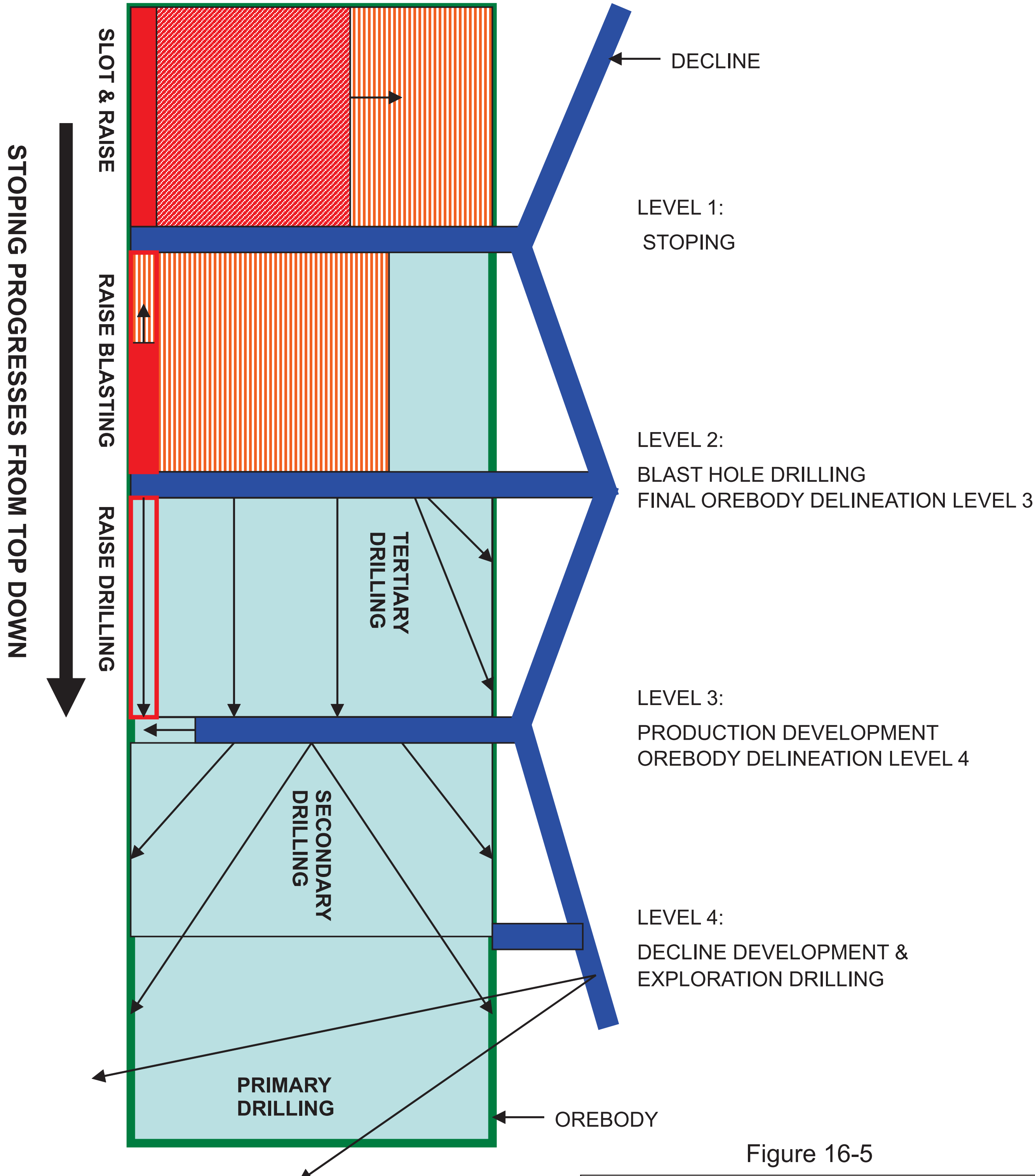


Figure 16-5

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Mining Sequence

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

The Rosh Pinah mine utilizes a fleet of Atlas Copco Boomer drill jumbos, seven Elphinstone AD 30 haulage trucks, one Bell 33 haulage truck, remote-capable Elphinstone scooptrams, including one R1300 unit, four R1600 units, and one R1700 unit, and two Atlas Copco Simba ITH dills. In addition, there are various service vehicles including forklifts, scissor lifts, explosive loading units, a roof bolter, a scaler, a secondary breaking unit, and low profile graders. RPA is of the opinion that the underground mobile equipment is suitable for the LOM plan.

All mobile equipment servicing, fuelling, and repairs are carried out on surface in a purpose built workshop. The workshop is substantial with a large concrete floored shop with four bays for general work and hot work. There is a separate servicing area with two ramps and also a separate tire workshop. The workshops are covered by sheet metal and have concrete brick sides and store rooms. Fire protection is via large foam trolleys and fire extinguishers only, however, the large pieces of mobile equipment all have foam-based fire protection installed. In addition to the heavy equipment, approximately 40 pieces of light mobile equipment are also maintained.

In 2017, an underground workshop is being commissioned on the 100 level so that fluid top-ups and daily inspections can be done underground.

GEOMECHANICS, GROUND SUPPORT

The Rosh Pinah mine has a specific set of ground conditions that negate the need for substantial ground support systems. These favourable conditions are due to the relatively shallow depth, which is no more than 600 m below surface, a mostly competent surrounding rock mass and relatively low regional stress fields. As a result, the stopes are largely left open and are only filled with waste rock as a means to reduce haul cycle time rather than for ground control reasons.

Stability issues are due to geological structures and occur at the interface of the ore zone and the host rock. These are dealt with using a variety of ad hoc bolting and meshing designs dependant on the specific area. There is a team of geotechnical engineers on site who, with support of the geological team, gain geotechnical data from the original core logs, use rock mass rating systems with empirical charts for initial stability assessment and design, and complete underground structural mapping of developed drifts and verification of core logs. This comprehensive data gathering is used to build 3D structural models of the mining areas and maintain a 3D block model of geotechnical information. In addition the team performs analysis of joint orientations from underground mapping using a variety of computer based programs in order to provide input into mine design and planning which includes a sign off procedure of new designs.

Based on these studies, secondary roof support is installed which consists of 2.4 m roof bolts on a 1 m x 1 m pattern where necessary. This support also consists of a wire mesh and strapping system if the areas are particularly bad. Every month, there is an operational and geotechnical review session where hazardous areas are reviewed and secondary support techniques evaluated.

RPZC is investing in a seismic monitoring system and has installed an IMS Automatic Monitoring system in the EF1 areas. This consists of three Uni-axle sensors and four Tri-axle sensors. A similar system is being equipped in WF3 consisting of three Uni-axle sensors and three Tri-axle sensors along with two more sensors (one Uni-axle and one Tri-axle) in some of the older areas.

Preliminary modelling has also identified the need for a slightly altered mining method in WF3 to manage a potential risk of increased side wall failures. This is potentially due to weaker argillite being in the side walls. Initial mitigation measures are to minimize the width of the openings as well as leaving pillars between ore blocks. This has been expanded to cable bolt the extremities of the orebody with bolts of between 11 m and 25 m in length as the stopes are developed. This is designed to create a stable back to stop scaling of the stopes over time which increases rock fall risk and dilution of the ore block.

RPZC is also installing a network of underground extensometers to measure movement in certain parts of the orebody. It is planned to have seven in EF1 and six in WF3. A total of 14 surface beacons are being installed on surface to track any subsidence as the mine deepens.

INFRASTRUCTURE

MINE VENTILATION

The Rosh Pinah mine consists of four primary ventilation sections with each one serviced by main ventilation fans. In general, mine adits are used as intake airways and open stopes as return airways. This ensures that the bulk of the underground working places are ventilated by means of through ventilation. Working places yet to hole for the establishment of through ventilation are ventilated using a force exhaust system of auxiliary fans. At present, the total flow rate is approximate 560 m3 per second.

Current fan types and capacities in use at the Rosh Pinah mine are:

- SF3 – 1 x 185kW Axial Flow Airtec fan producing 110 m3/s
- WF3 – 1 x 185kW Axial Flow Airtec fan producing 180 m3/s
- EF1 – 2x 220kW Centrifugal Donkin fans producing 180 m3/s
- Main Ore Conveyor exhaust - 1 x 110kW Axial Flow Howden fan producing 90 m3/s

The main ore conveyor exhaust system is a new feature which now means that any dust generated by the conveyor, or in the worst case smoke, is exhausted and not introduced into the mine.

There is a dedicated ventilation engineer on site and all areas are modelled using a computer based ventilation simulation program. This is used to model the air requirements and specify the maximum numbers of people and diesel equipment that can be in any one area at a time.

MINE DEWATERING

The mine is relatively dry, however, improvements are required in water handling system. The underground dewatering system currently consists of five pump stations at WF3, five pump stations at EF1, and one pump station at SF3. The pump stations are arranged in series having a design capacity of 120 m^3/h with an average daily flow of 14.5 m^3/h.

A groundwater risk assessment was carried out in 2015 as input to the WF3 geotechnical feasibility study. The risk assessment concluded from model simulation and predictions that WF3 mining is not expected to cause a major increase in groundwater influx to the underground workings. The overall risk of groundwater to the WF3 mine development is considered low. If no major structure is intersected, the increase in flow will be limited.

MINE POWER

Power for the mine is received from the main incoming substation via the EF1 Surface Sub Station at 3.3 kV and distributed at 3.3 kV to two underground sub stations. The 201E substation feeds all of the infrastructure in EF1 and the SW30 substation feeds all of the infrastructure in the WF3 and SF3 Zones. In these two substations, SF6 vacuum switch gear steps the 3.3 kV down to 380 V for use in the mine. The only exception is the underground crusher, rock breaker, and main transport conveyor which are fed via the surface tertiary crusher substation.

All underground and surface substations and MCCs that feed power to the mine have fire detection systems that alarm locally and are also equipped with a CO2 based gas fire suppression system.

RECONCILIATION

Rosh Pinah has a standard end of month production measurement system that reports and provides reconciliation between geology and the monthly mine production.

- Reconciliation is completed every week and then combined for a monthly reconciliation.
- CMS survey scans are used to calculate the amount of unplanned waste that went through into the system. Underground visits are used to estimate the unplanned waste percentage in case there are no survey scans.
- Ring design and block model superimposition are used to determine the type of extra material mined.
- Calculate the opening and closing stock grade
    - The opening stock grade for the current month is equal to the closing stock grade for the previous month and it is the weighted average of the secondary and tertiary stock grade.
- Calculate the official ROM
    - At the end of the month the surveyors will measure the ROM and the secondary and tertiary stockpile.
    - The plant will report the milled tonnages.

- o If the stockpiles are empty, the ore from underground goes straight to the plant without accumulating at the stockpiles.
- o If the plant processes more tonnes that the ROM, the difference or extra material is assumed to be processed from the stockpile. In this case the ROM grade is calculated by multiplying the reconciled grade by ROM tonnes plus opening stock grade by the difference between the milled tonnes and the ROM tons divided by milled tonnes.
- o If the plant processes less materials as compared to the ROM, then the difference is added to the stockpile and the ROM grade is equal to the reconciled grade.
- o If extra materials were added to the stockpile, the grade of the stockpile should be calculated and updated and the stockpile grade will be calculated by multiplying the closing stockpile tonnes by closing grade plus the ROM grade of the current month by the total tonnes added to the stockpile during the same month divided by the total stockpile tonnes (sum of added tonnes and closing stock tonnes)

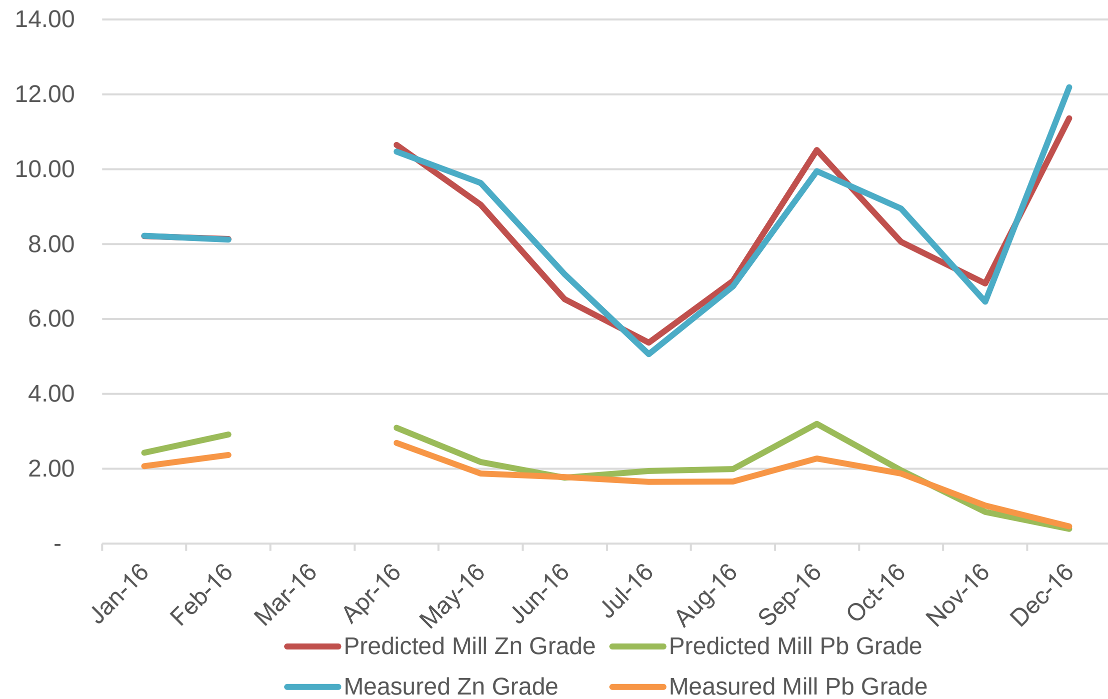
Table 16-1 presents a summary of the predicted versus measured head grades for 2016. The data is charted in Figure 16-6.

TABLE 16-1 2016 PREDICTED VS. MEASURED HEAD GRADES
Trevali Mining Corporation – Rosh Pinah Mine

Date	Predicted Mill Production			Actual Measured Head Grades		
	Tonnes	Zn Grade (%)	Pb Grade (%)	Tonnes	Zn Grade (%)	Pb Grade (%)
Jan-16	54,358	8.21	2.43	54,358	8.22	2.07
Feb-16	44,785	8.14	2.91	44,785	8.12	2.37
Mar-16*	-	-	-	-	-	-
Apr-16	21,663	10.65	3.10	21,663	10.47	2.69
May-16	61,137	9.05	2.18	61,137	9.63	1.87
Jun-16	49,247	6.53	1.76	49,247	7.20	1.78
Jul-16	55,176	5.37	1.94	55,176	5.06	1.65
Aug-16	57,159	7.02	1.99	57,159	6.87	1.66
Sep-16	48,918	10.51	3.20	48,918	9.95	2.27
Oct-16	60,363	8.06	1.96	60,363	8.95	1.87
Nov-16	60,363	6.95	0.85	60,363	6.46	1.02
Dec-16	48,685	11.36	0.39	48,685	12.19	0.46

Note. * During 2016, there was an industrial action (strike) which lasted 53 days from February 24, 2016 to April 17, 2016.

FIGURE 16-6 2016 GRADE RECONCILIATION



LIFE OF MINE PLAN

RPZC personnel have prepared a LOM based on the 2017 budget (Table 16-2). The RPZC LOM includes mining all of the Mineral Reserves.

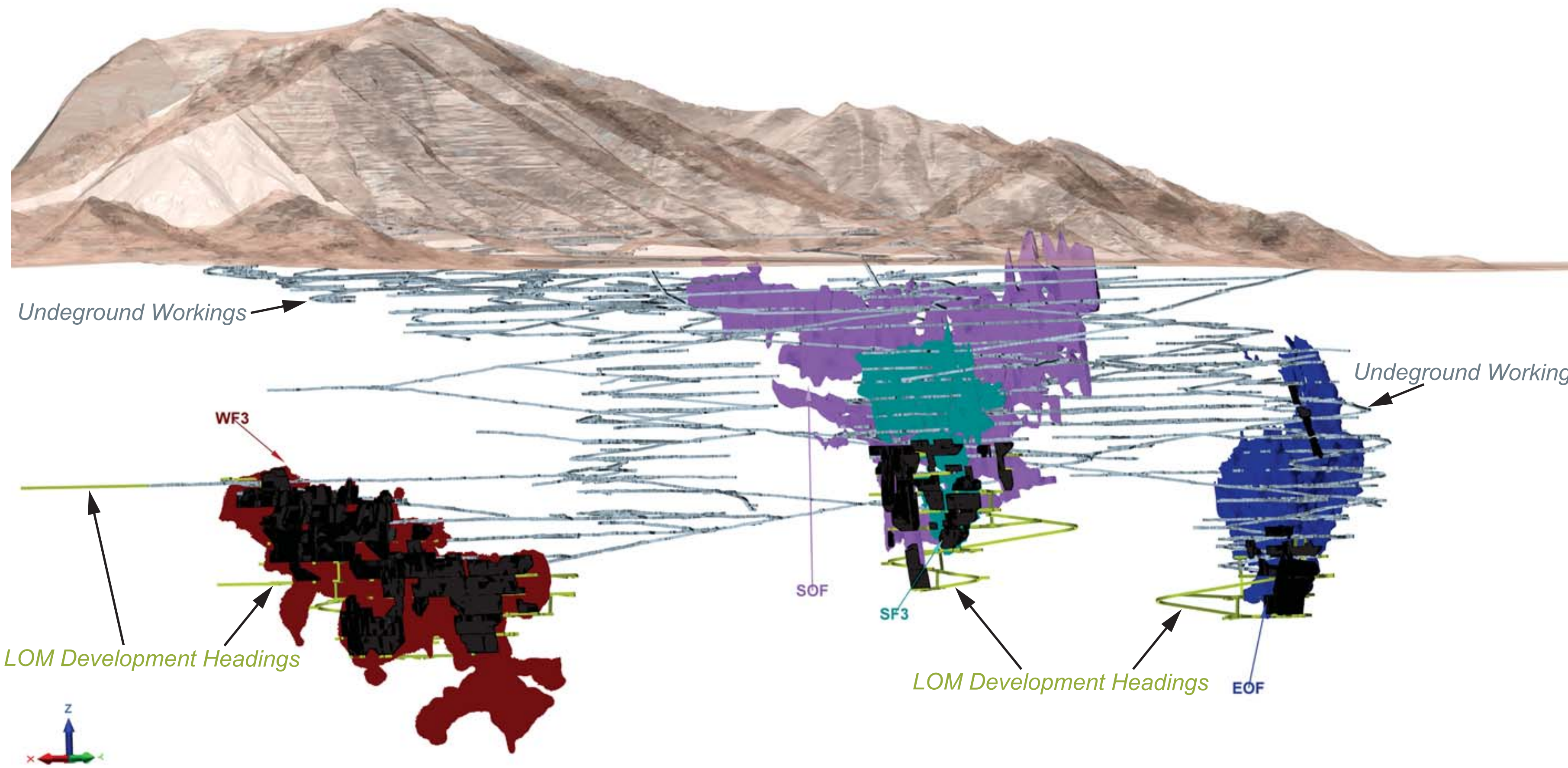
Average daily production over the LOM is 1,820 tpd, or 648,000 tpa. The LOM indicates that, based on mining Mineral Reserves only, mine development will be complete by 2020. Annual production climbs in 2021, once all development is complete. The increase in production is a function of additional trucking capacity once waste haulage is eliminated.

The LOM includes up to 5,000 m per year of ore and waste lateral development in 2017 and 2018, falling off to 4,600 m in 2019 and finally dropping to 2,200 m in 2020. The 2017 and 2018 development rates equate to 3.8 blasts per day or 13.7 m of advance per day (m/day).

Figure 16-7 shows mining and development over the LOM.

TABLE 16-2 LIFE OF MINE PRODUCTION SCHEDULE
Trevali Mining Corporation – Rosh Pinah Mine

ROM Production		Total	2017	2018	2019	2020	2021	2022	2023	2024
Stope Ore	000 t	4,965	525	539	570	628	675	675	676	360
Development Ore	000 t	359	138	113	75	33	-	-	-	-
Total Ore	000 t	5,007	663	652	645	661	675	675	676	360
Average Production	t/d	1,820	1,816	1,786	1,767	1,811	1,849	1,849	1,852	1,855
Development										
Ore Development	metres	4,630	1,775	1,464	970	421	-	-	-	-
Waste Development	metres	12,128	3,169	3,529	3,644	1,786	-	-	-	-
Total	metres	16,758	4,944	4,994	,613	2,207	-	-	-	-
Rounds/Day			3.8	3.8	3.5	1.7	-	-	-	-
Drilling										
Cable Drilling – Simba 7	metres	26,175	8,434	17,741	-	-	-	-	-	-
Raise Drilling – Simba 6	metres	39,500	12,000	12,500	1,000	4,750	7,000	2,250	-	-
Blasthole Drilling	metres	423,874	66,855	68,182	113,173	62,441	44,160	61,185	7,878	-
Total Simba Drilling	metres	489,549	87,289	98,423	114,173	67,191	51,160	63,435	7,878	-
Simba m/d	m/d	192	239	270	313	184	140	174	22	-
Exploration Drilling	metres	115,980	21,900	17,480	21,930	17,630	15,080	10,980	10,980	-



NOTE: Black shapes are LOM Stope Areas

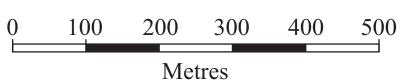


Figure 16-7

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

LOM Mining and Development

April 2017

Source: RPA, 2017.

RPA

www.rpacan.com

17 RECOVERY METHODS

SUMMARY

The process plant includes crushing, screening, and grinding followed by lead/zinc flotation, and filtering to produce separate lead and zinc concentrates.

The ROM ore is hauled from the underground production areas over a distance of approximately 4.2 km to the ore tipping location (Krupp) located some 320 m below surface. From the Krupp and primary crushing station, located underground, the ore is conveyed into the beneficiation plant through a series of conveyor belts for further crushing, screening, and grinding.

The ROM ore is fed through a grizzly to the primary jaw crusher at a rate of 140 tonnes per hour (tph) to 160 tph. The product is conveyed to the surface onto the primary screen where the oversize (+28 mm) is sent to the secondary cone crusher. Product from the crusher is sent back to the primary screen in closed circuit configuration. The undersize (-28 mm) from the primary screen is sent to the primary stockpile.

The secondary screen is fed from the primary stockpile at a rate of 100 tph to 110 tph. The oversize (+8 mm) is sent to the tertiary gyro-disc crusher. Crusher product is sent back to the secondary screen in closed circuit configuration. The undersize (-8 mm) from the secondary screen is sent to the mill feed stockpiles that act as a buffer between the milling and crushing circuit.

From the mill feed stockpiles, the ball mill is fed at a rate of 85 tph to 90 tph solids feed. The ball mill is a 1,000 kW Osborn ball mill measuring 12 ft by 12 ft. Sodium Cyanide is added in the mill to depress sphalerite and pyrite and Aerophine or Sodium Normal Propyl Xanthate (SNPX) is added to collect the galena. The milling circuit has two stages of cyclone classification in closed circuit with the mill to produce the lead flotation feed with a P80 of 106 µm. A third stage of cyclones dewaters the flotation feed slurry to an optimal density.

Figure 17-1 shows the plant flowsheet.

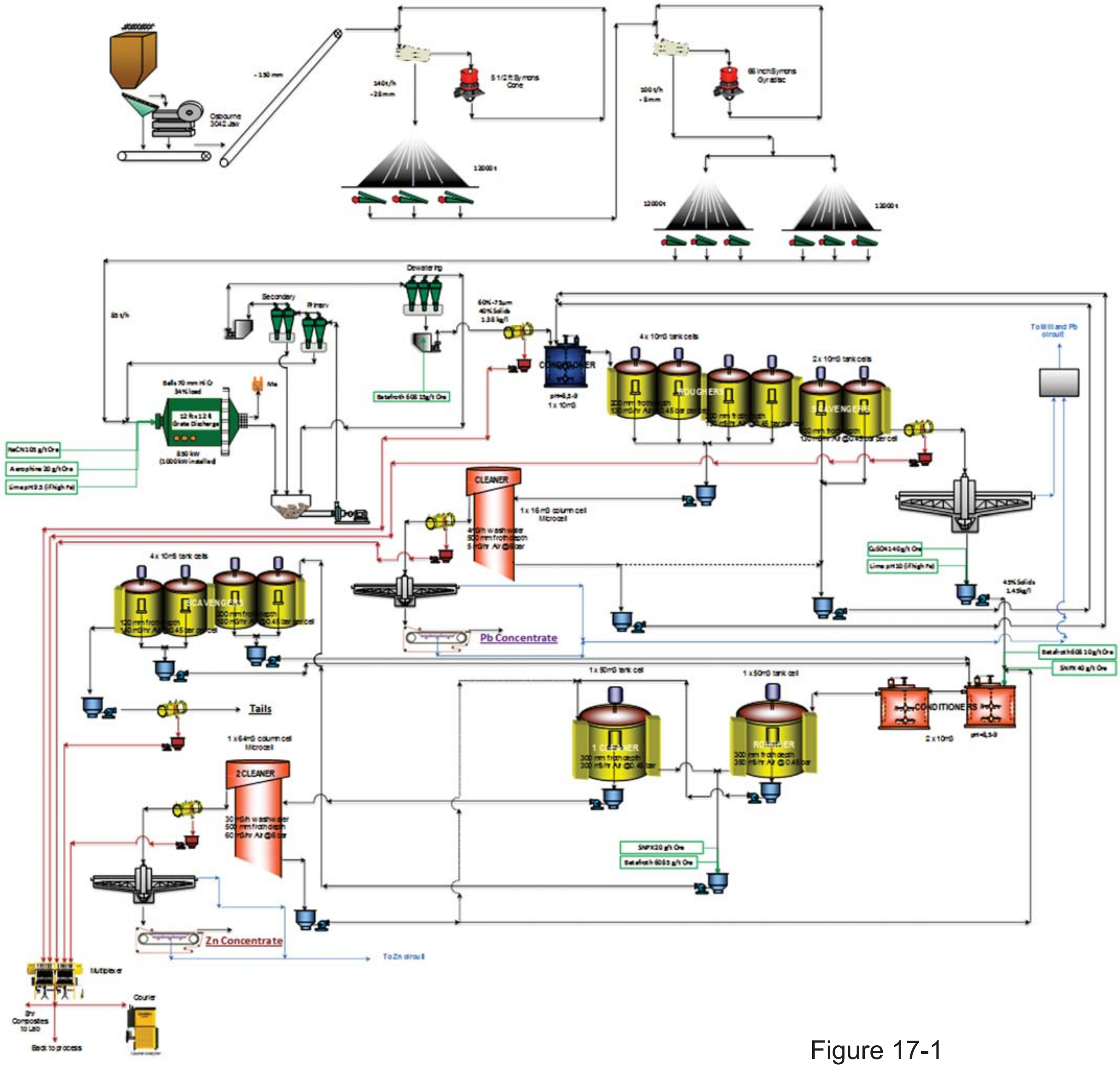


Figure 17-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Plant Flowsheet

April 2017

Source: Rosh Pinah Zinc Corp., 2016.

The product from the milling circuit is sent to a conditioner where frother is added before it passes on to four rougher tank cells. The concentrate from the roughers are sent to the lead column cell and the tails to two scavenger tank cells. Tails from the lead column cells are recycled back to the conditioner and the final concentrate sent to the lead concentrate thickener and belt filter for dewatering. The scavenger concentrates are also recycled back to the conditioner while the scavenger tails become the feed to the zinc circuit which first passes through two parallel intermediate thickeners. The main purpose of the intermediate thickeners is to recover and recycle process water back to the lead and milling circuit. The final lead concentrate from the belt filter is discharged onto a drying floor, where it is dried and stockpiled until loaded onto trucks for dispatch to the port of Luderitz.

The underflow of the intermediate thickeners is fed to two zinc conditioners in series where copper sulphate is added to activate the sphalerite, SNPX added to collect the sphalerite, lime (occasionally to depress pyrite) and frother added. From the conditioners it is fed to a rougher tank cell which has its concentrate fed to a cleaner cell and its tails to a series of four scavenger tank cells. The concentrate from the cleaner cell feeds the final zinc column which in turn produces the final zinc concentrate which is sent to the zinc thickener and belt filter for dewatering. The final zinc concentrate from the belt filter is discharged onto a drying floor, where it is dried and stockpiled until loaded onto trucks for dispatch to the port of Luderitz.

The tails from the cleaner cell is combined with that of the rougher tails that feed the scavenger cells. The final column tails and the scavenger concentrate are both recycled back to the conditioners. The scavenger tails is sent to the tailings thickener. The tailings thickener is redundant and merely serves as surge tank whose “underflow “is pumped to the tailings dam.

PRODUCTION SCHEDULE

The LOM process plant production schedule is shown in Table 17-1. Based on RPZC’s expected benefits shown in Section 13, the LOM schedule includes RPZC’s revised benefits from the regrind project from 2018 onwards including:

- Lead recovery increase of 2.5%.
- Lead concentrate grade increase of 0.5%.
- Zinc recovery increase of 0.9%.
- Zinc concentrate grade increase of 1.6%.
- Reduced zinc impurities penalty of US$5.00/t of zinc concentrate.

TABLE 17-1 LIFE OF MINE PLANT PRODUCTION SCHEDULE
Trevali Mining Corporation – Rosh Pinah Mine

ROM Production		Total	2017	2018	2019	2020	2021	2022	2023	2024
Milled	000 t	5,007.3	636.7	654.8	666.3	672.3	669.8	669.0	709.8	328.6
Zinc Grade	%	8.8	9.8	8.7	8	9.8	9	8.4	8.4	7.4
Lead Grade	%	1.4	1.2	2	1.4	0.9	1.2	2.3	1.3	1.1
Silver Grade	g/t	20.7	22.9	28.2	14.2	14.9	13.7	30.9	26.9	7.4
Gold Grade	g/t	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Zinc Concentrate	000 t	725.3	105.7	94.1	87.5	108.8	99.5	91.8	97.9	40.0
Zinc Grade	%	54.2	52.4	54.5	54.1	55.1	54.7	54.3	54.4	54
Zinc Recovery	%	89.4	89.0	89.5	88.6	90.7	89.9	89.1	89.3	88.5
Lead Concentrate	000 t	99.2	9.6	19.0	12.6	6.9	11.2	23.5	11.6	4.8
Lead Grade	%	50.8	49.3	52.1	50.6	50.0	49.1	51.9	50.0	51.0
Silver Grade	g/t	419	604	390	300	578	330	352	660	202
Gold Grade	g/t	4.6	5.9	3.1	4.8	8.8	5.4	2.6	5.5	6.1
Lead Recovery	%	70.2	63.9	75.7	69.0	55.4	65.6	78.0	64.8	71.6
Silver Recovery	%	40	40	40	40	40	40	40	40	40
Gold Recovery	%	30	30	30	30	30	30	30	30	30
Payable Zinc	000 t	333.9	46.9	43.6	40.2	51.0	46.2	42.4	45.3	18.3
Payable Lead	000 t	47.4	4.5	9.3	6.0	3.3	5.1	11.5	5.4	2.3
Payable Silver	000 oz	1,176.7	171.8	207.1	101.5	117.3	100.4	228.3	226.7	23.6
Payable Gold	ounces	11,299	1,532	1,285	1,523	1,723	1,579	1,179	1,683	795

18 PROJECT INFRASTRUCTURE

SUMMARY

The Rosh Pinah mine site infrastructure plan is shown in Figure 18-1. The key Rosh Pinah mine facilities include:

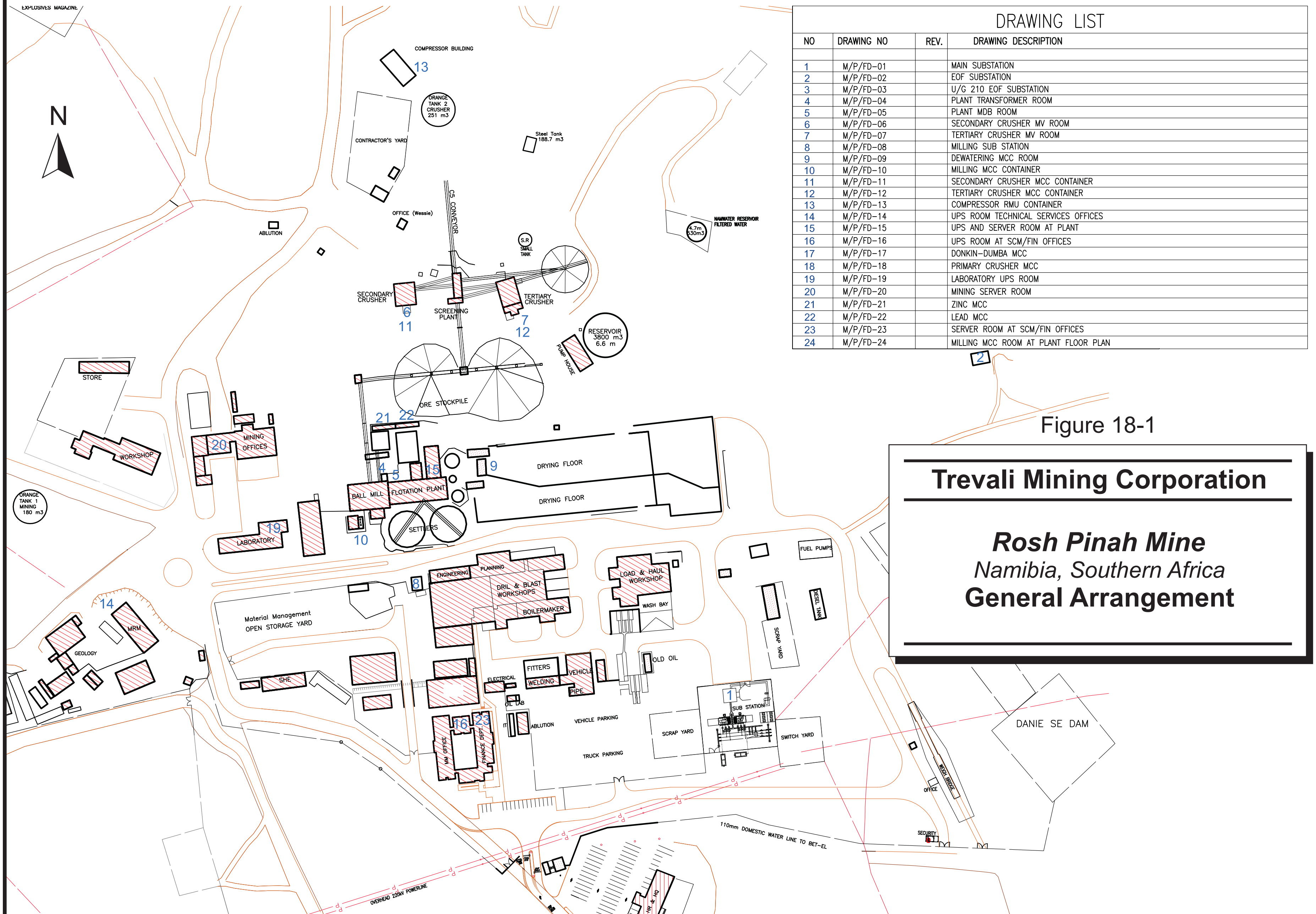
- Administration Building
- Human Resources Building
- Security Building
- Safety/Health/Environment Building
- Drill and Blast Workshop
- Load and Haul Workshop
- Welding and Fitter Workshop
- Maintenance Offices
- Mining Office
- Geology Office
- Core Storage Facilities
- Change Facilities
- Plant Workshop
- Warehouse & Reagents Storage
- Laboratory
- MCC Building (Switchrooms)
- Process Control Rooms
- Plant Office
- Warehouses and Stores Yards
- Accommodations for mine employees
- Firefighting equipment including a fire truck
- Diesel storage tanks (two) with a capacity of 82,000 l and 23,000 l

CRITICAL SPARES

Due to the remote location, the following are major critical spares kept onsite.

- Rock Hammer
- Reconditioned Jaw Crusher Shaft Assembly (jaw stock)

- Jaw Crusher Crushing Wearing components
- Spare reconditioned feeding vibrating screens
- Cone Crushers recon bowls
- Cone Crushers recon main shafts
- Cone Crusher wearing parts
- All machineries driving electrical motor
- 1,000 W ball mill motor
- Ball mill gearbox
- Ball mill pinion gear
- Ball mill ring gear
- Agitators for floatation plant
- Plant & underground supply electrical transformers and motors
- Scoop and Truck Engines
- Compressors
- Scoop and Truck Transmissions
- Boomer and Simba Hammers
- Differentials



DRAWING LIST

NO	DRAWING NO	REV.	DRAWING DESCRIPTION
1	M/P/FD-01		MAIN SUBSTATION
2	M/P/FD-02		EOF SUBSTATION
3	M/P/FD-03		U/G 210 EOF SUBSTATION
4	M/P/FD-04		PLANT TRANSFORMER ROOM
5	M/P/FD-05		PLANT MDB ROOM
6	M/P/FD-06		SECONDARY CRUSHER MV ROOM
7	M/P/FD-07		TERTIARY CRUSHER MV ROOM
8	M/P/FD-08		MILLING SUB STATION
9	M/P/FD-09		DEWATERING MCC ROOM
10	M/P/FD-10		MILLING MCC CONTAINER
11	M/P/FD-11		SECONDARY CRUSHER MCC CONTAINER
12	M/P/FD-12		TERTIARY CRUSHER MCC CONTAINER
13	M/P/FD-13		COMPRESSOR RMU CONTAINER
14	M/P/FD-14		UPS ROOM TECHNICAL SERVICES OFFICES
15	M/P/FD-15		UPS AND SERVER ROOM AT PLANT
16	M/P/FD-16		UPS ROOM AT SCM/FIN OFFICES
17	M/P/FD-17		DONKIN-DUMBA MCC
18	M/P/FD-18		PRIMARY CRUSHER MCC
19	M/P/FD-19		LABORATORY UPS ROOM
20	M/P/FD-20		MINING SERVER ROOM
21	M/P/FD-21		ZINC MCC
22	M/P/FD-22		LEAD MCC
23	M/P/FD-23		SERVER ROOM AT SCM/FIN OFFICES
24	M/P/FD-24		MILLING MCC ROOM AT PLANT FLOOR PLAN

Figure 18-1

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

General Arrangement

April 2017

Source: Rosh Pinah Zinc Corp., 2015.

TAILINGS STORAGE FACILITY

Plant tailings are deposited onto a tailings storage facility (Figure 18-2) which is managed by Fraser Alexander (a South African company which provides mining and related services across the entire mining industry) in accordance with a Code of Practice. The dam was also designed by Fraser Alexander. As part of the ongoing work, Fraser Alexander provide monthly inspections as well as an annual report.

The tailings dam is constructed by means of the upstream method of wall construction, using tailings material as the construction media. As there in no clay in the tailings the material is essentially free draining with very little moisture retained.

The side slopes of the outer walls of the tailings dam are developed at 1V:3H with benches of 6 m wide for every 7 m vertical rise. The tailings dam currently consists of three separate dams each with its own penstock. The long term strategy is to combine the three dams into two to allow flexibility in the tailings dam operation and to manage the rate of rise as the dam gets higher. In addition, it will also allow the application of a dust suppressant on the unused areas to minimize fugitive dust.

The tailings is transferred from the plant to the tailings dam by two tailings pumps (one standby) in a 200 mm high density polyethylene (HDPE) pipe and distributed for deposition on the tailings dam by means of a ring feed system.

Deposition switches between the separate dam areas during the year allowing one area to dry while tailings are deposited elsewhere. The tailings deposition is done such that tailings and free water gravitate to a pool at the centre of each dam whose depth shall not exceed 0.3 m. Clear water is decanted through the penstock towers to water retaining dams at the east and south side of the tailings dam. A portion of this water is returned to the plant for re-use as well as dust suppression at the tailings dam. The average monthly deposition for 2015 was 48,300 tonnes per month and for 2016 it is 48,000 tonnes per month.

Figure 18-2

Trevali Mining Corporation

Rosh Pinah Mine

Namibia, Southern Africa

Aerial View of Tailings Storage Facility

Source: Rosh Pinah Zinc Corp., 2016.

The minimum allowed freeboard determined for the tailings dam is 1.5 m. The current vertical freeboard average for the dam is 1.7 m. The rates of rise for any one of the three dams, or the entire tailings dam, is not allowed to exceed 3.5 m/year to ensure dam stability. The current tailings dam is able to accommodate the ±50,000 tonnes/month until August 2025 at which point the rate of rise will exceed 3.5 m/year.

The final elevation of the tailing dam will be at 400 m above mean sea level, which relates to a maximum height of approximately 45 m.

The facility is surrounded by a number of piezometers to monitor water table levels to see if there are any leaks into to the surrounding area.

There is no spill way designed into the tailings facility as the penstocks have been over designed to act as emergency water egress. The facility has two catchment dams and these collect all surface run off water and water from the penstocks.

CONCENTRATE STORAGE AND TRANSPORTATION

Zinc and lead concentrate is placed on a drying floor attached to the processing plant where it is dried and stockpiled until loaded onto to trucks for dispatch 300 km to the port of Luderitz.

19 MARKET STUDIES AND CONTRACTS

MARKETS

Global zinc demand continues to rise by approximately 2% to 3% per annum (or 280,000 t to 420,000 t of zinc metal) driven by gross domestic product (GDP) growth, urbanization, and infrastructure development, and as a "mid-cycle" commodity with expanding markets for consumer goods (automobiles, appliances, etc.) Primary zinc supply is in deficit following the recent closures of global marquee mines (Brunswick-12, Century, and Lisheen). There is consensus forecast of a significantly tightening zinc market over the next several years as supported by both increasing zinc commodity pricing and global zinc smelting shortfalls due to inability to secure sufficient zinc concentrates in addition to decreasing Spot and Annual benchmark smelting charges from 2015 onwards. Wood Makenzie, an independent global commodity forecast consultant, is predicting robust zinc commodity prices over the short-term; averaging $1.46/lb in 2017 and $1.76/lb in 2018.

In addition, lead, predominantly produced as by-product of zinc mining is also expected to strengthen during this period.

CONTRACTS

As part of the transaction, Trevali will enter into LOM concentrate offtake agreements with Glencore International A.G. for all concentrates at International Benchmark terms, that is, average London Metal Exchange (LME) pricing for any given shipping period and smelter charges based on the industry annual negotiations between third party smelting and mining groups.

The author has reviewed the concentrate treatment charges, payable amounts, and commodity prices projected by Trevali. The results support the assumptions used in this Technical Report: In summary current concentrate treatment charges are lower (Teck and Korea Zinc recently settled at $172/t flat) and average LME spot commodity prices are higher those used in the report.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

Rosh Pinah mine has an Occupational Health, Safety and Environment Commitment (HSEC) Policy (2016) outlining their commitment to the prevention of pollution and the undertaking of business in an environmentally sound manner. These commitments are then implemented and managed through a certified ISO 14001:2004 Environmental Management System, which is valid until November 15, 2017. RPZC will need to convert this system to the 2015 ISO 14001 Standard which has been committed for 2017. A certified ISO 14001: 2015 Management System is not a legal requirement, however, it is a best practice principle and provides a benchmark for Environmental Management.

In addition to the HSEC Policy, the approved Environmental Management Plans (EMP) provide the framework for Rosh Pinah mine's environmental management. The EMPs outline mitigation measures to minimise and manage negative impacts to the biophysical and social environment based on specialist studies conducted as part of the Environmental Impact Assessment. As per the requirements of the Environmental Management Plan, regular monitoring and bi annual evaluation of environmental performance through compliance audits is undertaken by an external consultant (A Speiser Environmental Consultants CC).

ENVIRONMENTAL STUDIES

RPZC produces tailings waste, domestic waste, and hazardous waste as part of its operations. Domestic and hazardous waste management is guided by the procedure "SPI 021 Waste Management on Rosh Pinah Base Metals", which forms part of the certified ISO 14 001 Environmental Management System. The audit findings of January 2017 (Environmental Performance Audit for RPZC on Mining Licence ML 39 July –December 2016, A Speiser) identify risks associated with waste disposal and management on site, including the lack of rehabilitation plans for the "old waste site", management of hydrocarbon waste and bioremediation facility. This will need to be investigated and managed to ensure no material impact arises and affects the extraction of the mineral resources or mineral reserves.

The tailings dam at RPZC is situated approximately 1.5 km to the south of the plant area and 500 m south-east of Rosh Pinah village. The location of the tailings dam was identified in 1969 when mining operations started. The dam has no liner system to prevent seepage into groundwater (Environmental overview and Environmental Management System at Rosh Pinah mine, November 2008 – EIA 2008- A Speiser). Monitoring wells have been drilled around the impoundment and monitor possible seepage into the groundwater.

Groundwater samples from the monitoring wells are taken on a regular basis. In terms of water quality which is undertaken on surface and ground water, there were various exceedances noted in the water quality data (including arsenic) for September 2016. An external audit (Environmental Performance Audit for RPZC on Mining Licence ML 39 July – December 2016, A Speiser) indicated that samples were tested on site at Rosh Pinah which is not an accredited laboratory. Subsequently a decision was taken by Rosh Pinah to analyse the samples at an accredited facility in Windhoek. Water quality results will need to be reviewed once the first set is received from the accredited laboratory to understand the risk associated with these exceedances.

In terms of monitoring dust fallout, there are 12 dust buckets on site and in the town which monitor deposition of dust and which are analysed according to the South African Standard as best practice in light of dust fallout not being adequately addressed in the existing Namibian Legislation. Dust fallout results for the period 2015 to September 2016 are consistently higher than the allowable limits as per the South African Standard. The exceedances in the PM10 results need to be addressed and mitigation measures implemented to reduce the environmental risk and the risk to human health. Additionally, lead exposure to employees is monitored where required in terms of the Lead Regulation of Namibia. The 8-Hour Equivalent TWA Occupational Exposure Limit (E8hEV) for Lead is 0.1 mg/m^3 (Inorganic Lead). Subsequent to the review of the reports, various exceedances were recorded, however, mitigation measures were recommended and if implemented successfully the risk of exposure will be greatly reduced. It is to be noted that proactive monitoring is now taking place and a permanent Occupational Hygiene Officer has been appointed to manage this risk.

Water is supplied to the mine and village by NamWater, which operates a water treatment plant at the Orange River, 23 km south of Rosh Pinah. Water availability/ security is dependent on the availability of water from the Orange River. The Orange River originates in the Republic of South Africa and hence the upstream users (in South Africa) affect the availability of water in Namibia. There is an agreement in place between the two governments, however there are risks associated with capacity during constrained times.

PROJECT PERMITTING

The Republic of Namibia has five tiers of law and a number of policies relevant to environmental assessment and protection, which includes the Constitution, Statutory Law, Common Law, Customary Law, and International Law. As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation.

Mining in Namibia is mainly regulated by the Minerals (Prospecting and Mining) Act 33 of 1992 (Minerals Act) as amended by the Minerals (Prospecting and Mining) Amendment Act 8 of 2008. In terms of the Minerals Act, an Environmental Impact Assessment study must be furnished to the Ministry of Environment before a mining project can proceed. It should be noted that while this Act dealt with environmental matters arising from prospecting in mining, the Act predated the Environmental Management Act 7 of 2007 (Environmental Act), which came into force in 2012. The current authorizations for the operation are aligned with the Environmental Act. Finally, the Minerals Act provides that the holder of a mineral licence must take all steps to the satisfaction of the Minister to remedy any damage caused by any mining activities. In the case of larger mining operations, the Minister would almost invariably demand guarantees that could be used by the Ministry to remedy damage caused by mining activities; this is in the form of closure financial liability. With this said, there is currently no mandatory mechanism for the funding of Final Mine Closure Plan.

In addition, to this overarching environmental legislation, aspect specific legislation is in place, including the Water Act, Act 54 of 1956), Nature Conservation Ordinance, No. 4 of 1975, Atmospheric Pollution Prevention Ordinance (1976) and the National Heritage Act 2004. As per the requirements of this Namibian Legislative Framework, all applicable environmental licences were valid at the time of the site visit and document review, but will need to be reapplied for by the date as indicated on the licences.

With regards to the environmental and social legislative requirements, the following licences/permits are applicable to Rosh Pinah mine as per Table 20-1.

TABLE 20-1 ENVIRONMENTAL AND SOCIAL LEGISLATIVE PERMITTING REQUIREMENTS
Trevali Mining Corporation – Rosh Pinah Mine

Legislation	Permits	Issue Date/ Expiry Date
Minerals (Prospecting and Mining) Act 33 of 1992 (Minerals Act) as amended by Minerals (Prospecting and Mining) Amendment Act 8 of 2008	Mining Licence No. 39 issued in terms of section 93 of the Minerals (Prospecting and Mining) Act 1992. Full Name of Licence Holder is PE Minerals (Namibia) (Proprietary) Limited. (Office Reference 14/2/3/2/39 dated 09/09/1996)	The licence is valid from November 13, 1995 to date of expiry November 12, 2020.
Environmental Management Act 7 of 2007	Environmental clearance certificate for the operation of Rosh Pinah Zinc Mine on Mining Licence 39, North of Orange River, /Kara Region.	Issued on September 21, 2016 and the certificate will expire on September 21, 2019.
	Environmental clearance certificate for the proposed exploration activities in terms of exclusive prospecting licence (EPL) No. 2616, Rosh Pinah, /Karas Region	Issued on May 13, 2016 and the certificate will expire on May 13, 2019.
	Environmental clearance for the environmental impact assessment and environmental management plan for the second amendment to the proposed zinc and lead storage and loading facility in Lüderitz Harbour, Karas Region	Issued on June 19, 2014 and the certificate will expire on 19 June 19, 2017.
Water Act, Act 54 of 1956	Domestic and industrial wastewater and effluent disposal exemption permit issued in terms of section 21(5) and 22(2) of the Water Act, 1956 (Act 54 of 1956). (Permit number 658)	Issued on November 11, 2014 and valid until November 30, 2019. Requirement for the renewal of this permit is two months prior to the expiry date.

SOCIAL OR COMMUNITY REQUIREMENTS

Rosh Pinah has historically been a mining village, built and managed by the mine for the employees of the mine. The town is inclusive of the Skorpion Zinc mine and the Rosh Pinah mine, and a joint-venture private company called RoshSkor was established to manage and operate the town as a private municipality. All services and infrastructure to operate and manage the village are provided through RoshSkor.

RoshSkor is also responsible for the implementation of Corporate Social Responsibility (CSR) projects, which are currently funded between Skorpion Zinc and RPZC. RPZC is approached with various projects and assists with the funding for projects aligned with their corporate objectives. Programs include training in basic needlework, hand weaving of carpets, development initiatives in the informal settlement of Tutengeni which involves the upgrade of a school, training of locals for the removal of waste and waste segregation, cleaning of enviroloos etc. Should Skorpion Zinc cease operations and/ or retract funding in the town for CSI projects, there may be a risk that the local inhabitants of Rosh Pinah will turn to RPZC for greater assistance with funding. In addition, should Skorpion Zinc cease to operate, RPZC will need to implement a strategy to deal with the high unemployment rates in the town and provide additional assistance in developing small micro scale business enterprises that are self-sustainable post the life of mine.

Key social challenges include strike action at the mine, critical skill availability in the local area and relationship management with the workforce when it comes to change management in the operation. Strikes/labour unrest pose a risk to the operation. Stakeholder Management Plans will need to be developed and implemented successfully to manage this aspect of the operation.

MINE CLOSURE REQUIREMENTS

The Mineral Policy of 2004 states that Government will investigate the establishment of mandatory mechanisms for the funding of Final Mine Closure Plans and Government will monitor mine closures to ensure that the mining industry has mechanisms to rehabilitate closed mines for the purpose of sustained land use. With this said, there is currently no mandatory mechanism for the funding of Final Mine Closure Plans or monitoring legislated and as such RPZC has a Mine Closure Plan developed using the South African Legislative Framework for Financial Provisioning as provided by the Department of Mineral Resources in the Mineral Petroleum Resources Development Act. As per the Golder Report “Review and Update of the Scheduled Closure Costs for the Rosh Pinah Zinc Mine” as at March 2015, the closure liability was estimated at R 54 447 738 (Namibian Dollar pegged to RSA Rand) or approximately US$3.8 million. A further updated is planned for February 2017.

DISCUSSION

Based on the site visit conducted on January 25 to 27, 2017 at RPZC the review of available reports and documents as well as discussions held with management, no evidence of environmental issues that could materially impact the ability to extract the mineral resources or mineral reserves at RPZC were observed. There are however environmental and social risks that need to be mitigated and managed, as detailed above and outlined below:

- The PM10 dust fallout levels at the mine at village of Rosh Pinah.
- The elevated lead in blood levels (Especially in areas that are affected by the tailing facility and in the storage area in Lüderitz).
- Surface and Ground Water Quality samples need to be handled and analysed in line with Laboratory Testing Standards to ensure data is adequate to understand potential pollution plumes developing around the operational facilities at the mine.
- Acid rock drainage potential needs to be evaluated and managed.
- Social expectations of employees and residents of Rosh Pinah, should Skorpion Zinc cease mining operations.
- RoshSkor will need to be managed in closing out of the audit findings regarding waste management.
- Plans to be developed around water and power security.

21 CAPITAL AND OPERATING COSTS

CAPITAL COSTS

Sustaining capital is mainly for equipment maintenance, exploration, mine development, mine equipment, process plant upgrades, and administration and information technology (IT). The business improvement capital of $7.3 million in 2017 is for the regrind project.

Table 21-1 presents the LOM sustaining capital.

TABLE 21-1 LIFE OF MINE SUSTAINING AND BUSINESS IMPROVEMENT CAPITAL COSTS
Trevali Mining Corporation – Rosh Pinah Mine

($ M)	2017	2018	2019	2020	2021	2022	2023	2024	Total
Engineering & HSEC	1.8	1.2	0.7	0.9	0.9	0.9	0.9	0.9	**8.2**
Exploration	0.9	1.0	1.0	0.8	0.0	0.0	0.0	0.0	**3.7**
Mine Development	6.7	7.1	7.0	3.1	0.0	0.0	0.0	0.0	**24.0**
Mining Equipment	3.0	5.8	4.1	5.0	5.0	5.0	5.0	5.0	**37.9**
Plant	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	**0.7**
Administration & IT	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	**1.5**
Total Sustaining	**13.0**	**15.5**	**13.2**	**10.0**	**6.1**	**6.1**	**6.1**	**6.1**	**76.0**
Business Improvement	7.3	1.1	-	-	-	-	-	-	8.4
Reclamation	-	-	-	-	-	-	-	3.8	3.8
Total Capital	**20.3**	**16.6**	**13.2**	**10.0**	**6.1**	**6.1**	**6.1**	**9.9**	**88.2**

RPA is of the opinion that sustaining capital costs are reasonable for an operation of the size and scope of Rosh Pinah.

OPERATING COSTS

Table 21-2 details the forecast LOM operating costs per tonne milled. The operating costs are based upon a continuation of the current operations and operating practices.

TABLE 21-2 LIFE OF MINE OPERATING COSTS
Trevali Mining Corporation – Rosh Pinah Mine

($/t Milled)	2017	2018	2019	2020	2021	2022	2023	2024	Total
Mining	19.01	18.48	18.16	18.00	18.07	18.09	17.05	17.05	**18.04**
Processing	11.37	11.05	10.86	10.77	10.81	10.82	10.20	10.20	**10.79**
Maintenance	8.88	8.64	8.49	8.41	8.44	8.45	7.97	7.97	**8.43**
Administration	6.62	6.72	6.90	7.29	7.32	7.32	6.90	6.90	**7.01**
Total	**45.88**	**44.89**	**44.42**	**44.47**	**44.64**	**44.69**	**42.12**	**42.12**	**44.26**

MANPOWER

The December 2016 headcount for RPZC employees was 463, four casuals, and 104 contractors, for a total of 571 people. The total number of RPZC employees is expected to increase to 485 according to the 2017 budget, with the majority of the increase in the maintenance and plant departments.

The workforce is unionized. During 2016, there was an industrial action (strike) which lasted 53 days from February 24, 2016 to April 17, 2016.

On April 18, 2016, a Memorandum of Agreement (MOA) was signed between RPZC and the Mineworkers Union of Namibia. The MOA is a collective agreement as provided for in terms of Section 70 of the Labour Act 11 of 2007 in respect of all employees within the bargaining unit. The MOA is in force from April 18, 2016 to December 31, 2017.

22 ECONOMIC ANALYSIS

A Cash Flow Projection has been generated from the LOM Plan production schedule and capital and operating cost estimates, and is summarized in Table 22-1. The associated process recoveries, metal prices, operating costs, refining and transportation charges, royalties, and capital expenditures (sustaining) were also taken into account. All costs are based on fourth quarter of 2016 estimates and presented in US dollars. Metal prices, as provided by Trevali, are based on consensus, long term forecasts from banks, financial institutions, and other sources. Some of the key parameters and assumptions for the pre-tax cash flow are as follows:

Revenue (100% Basis)

- 1,820 tpd
- LOM head grade: 8.78% Zn, 1.45% Pb, 20.75 g/t Ag
- Mill recovery averaging: 89.4%
- Metal prices based on consensus forecasts by year, averaging: $1.10/lb zinc, $0.93/lb lead, $19.35/oz silver
- Smelting and transport costs totalling $0.21 per pound payable zinc (net of by-product credits).
- NSR: $128 per tonne milled.

Costs (100% Basis)

- Mine life: 8.0 years
- Sustaining capital: $88.2 million
- Average operating cost over the mine life: $44.26/t milled
- Closure costs: $3.8 million
- Salvage costs: nil
- NSR Royalty: $40.9 million
- Net cash cost (equivalent to C1 cost), including capital, of $0.63 per pound of payable zinc (net of by-product credits).

TAXATION AND ROYALTIES

The corporate tax rate in Namibia for mining properties is a flat rate of 37.5%. RPA has relied on RPZC for calculation of taxes.

Mine production is subject to royalties at 3% of net market value payable to the Namibian State and 3% of net market value payable to PE Minerals. Additionally, production is subject to the provisions of Section 114 of the Minerals Act. Detailed quarterly and annual reports on all relevant aspects of operations must be submitted.

Allowable tax deductions for mining companies are as follows:

- All pre-production exploration expenditures are fully deductible in the first year of production; to the extent that this deduction exceeds income from mining operations for the year concerned, it will create an assessed loss for carry forward or set off against other income of the taxpayer;
- Subsequent exploration expenditures are not ring fenced and are fully deductible in the year they occur, so that profits from existing operations can be used to fund exploration in any part of the country;
- Initial and subsequent development costs (include all capital expenditure incurred in connection with the development operations) are fully deductible in equal installments over three years commencing in the year the mine starts production.
- Operating expenses incurred in the production of income are deductible for tax purposes.

The Minerals Act also makes provision for a penalty royalty (for the failure of beneficiating minerals in Namibia, where such beneficiation is possible, transfer pricing arrangements and excessive brokerage fees) as well as for a windfall royalty.

CASH FLOW ANALYSIS

Considering the Project on a stand-alone basis, the undiscounted pre-tax cash flow totals $331 million over the mine life.

The pre-tax Net Present Value (NPV) at a 10% discount rate is $229 million.

The Rosh Pinah mine cash flow projection is shown in Table 22-1.

TABLE 22-1 CASH FLOW SUMMARY - 100% BASIS
Trevali Mining Corporation - Rosh Pinah Mine

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
MINING											
Operating Days		days	2,733	365	365	365	365	365	365	365	178
Tonnes milled per day		tonnes / day	1,820	1,818	1,786	1,767	1,809	1,850	1,850	1,851	1,846
Production		'000 tonnes	5,007	637	655	666	672	670	669	710	329
Au Grade		g/t	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Ag Grade		g/t	20.75	22.87	28.21	14.21	14.85	13.74	30.93	26.87	7.43
Pb Grade		%	1.45%	1.17%	1.99%	1.39%	0.93%	1.25%	2.34%	1.26%	1.05%
Zn Grade		%	8.78%	9.77%	8.75%	8.01%	9.83%	9.03%	8.37%	8.40%	7.42%
PROCESSING											
Mill Feed		'000 tonnes	5,007	637	655	666	672	670	669	710	329
Au Grade		g/t	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Ag Grade		g/t	20.75	22.87	28.21	14.21	14.85	13.74	30.93	26.87	7.43
Pb Grade		%	1.45%	1.17%	1.99%	1.39%	0.93%	1.25%	2.34%	1.26%	1.05%
Zn Grade		%	8.78%	9.77%	8.75%	8.01%	9.83%	9.03%	8.37%	8.40%	7.42%
Contained Au		oz	48,296	6,141	6,316	6,427	6,484	6,460	6,452	6,846	3,170
Contained Ag		oz	3,340,473	468,205	593,918	304,375	320,998	295,964	665,314	613,179	78,520
Contained Pb		tonnes	72,371	7,452	13,047	9,259	6,238	8,351	15,658	8,915	3,451
Contained Zn		tonnes	439,419	62,223	57,278	53,382	66,072	60,488	55,965	59,624	24,389
Recovery Grade											
Pb Concentrate	Recovery #1	%									
Au			30%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Ag			40%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Pb			68%	63.9%	75.7%	69.0%	55.4%	65.6%	78.0%	64.8%	71.6%
Zn Concentrate	Recovery #2	%									
Zn			89.4%	89.0%	89.5%	88.6%	90.7%	89.9%	89.1%	89.3%	88.5%
Recovered Amount											
Pb Concentrate	Recovery #1										
Au		oz	14,489	1,842	1,895	1,928	1,945	1,938	1,936	2,054	951
Ag		oz	1,336,189	187,282	237,567	121,750	128,399	118,386	266,126	245,272	31,408
Pb		tonnes	50,419	4,761	9,880	6,387	3,457	5,478	12,210	5,775	2,471
Zn Concentrate	Recovery #2										
Zn		tonnes	392,983	55,394	51,282	47,319	59,944	54,353	49,853	53,259	21,579
Grades in Concentrate											
Pb Concentrate		tonnes	99,220	9,648	18,956	12,614	6,915	11,163	23,532	11,550	4,842
Au grade in concentrate		g/t	4.54	5.9	3.1	4.8	8.8	5.4	2.6	5.5	6.1
Ag grade in concentrate		g/t	418.87	604	390	300	578	330	352	660	202
Pb grade in concentrate		%	50.82%	49.3%	52.1%	50.6%	50.0%	49.1%	51.9%	50.0%	51.0%
Zn grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Concentrate Moisture				6.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Zn Concentrate		tonnes	725,316	105,710	94,101	87,505	108,842	99,450	91,841	97,905	39,961
Zn grade in concentrate		%	54.18%	52.4%	54.5%	54.1%	55.1%	54.7%	54.3%	54.4%	54.0%
Concentrate Moisture				8.0%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%	7.4%
Total Tonnes Concentrate		wmt	885,864	124,441	121,367	107,495	124,317	118,774	123,835	117,529	48,107
Total Recovered											
Au		**oz**	**14,489**	**1,842**	**1,895**	**1,928**	**1,945**	**1,938**	**1,936**	**2,054**	**951**
Ag		**oz**	**1,336,189**	**187,282**	**237,567**	**121,750**	**128,399**	**118,386**	**266,126**	**245,272**	**31,408**
Pb		**tonnes**	**50,419**	**4,761**	**9,880**	**6,387**	**3,457**	**5,478**	**12,210**	**5,775**	**2,471**
Zn		**tonnes**	**392,983**	**55,394**	**51,282**	**47,319**	**59,944**	**54,353**	**49,853**	**53,259**	**21,579**

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
REVENUE											
Metal Prices		**Input Units**									
Au		US$/oz Au	$1,303.76	$1,283.00	$1,300.00	$1,305.50	$1,313.75	$1,300.00	$1,325.00	$1,300.00	$1,300.00
Ag		US$/oz Ag	$19.35	$18.30	$18.50	$19.00	$20.00	$20.00	$19.25	$20.00	$20.00
Pb		US$/lb Pb	$0.93	$0.93	$0.92	$0.95	$0.94	$0.93	$0.95	$0.92	$0.92
Zn		US$/lb Zn	$1.10	$1.15	$1.19	$1.12	$1.10	$1.10	$1.08	$1.00	$1.00
Concentrate Payable %											
Pb Concentrate Payable %											
Payable Au		%	74.49%	83.2%	67.8%	79.0%	88.6%	81.5%	60.9%	81.9%	83.6%
Payable Ag		%	86.86%	91.7%	87.2%	83.3%	91.3%	84.8%	85.8%	92.4%	75.2%
Payable Pb		%	94.09%	93.9%	94.2%	94.1%	94.0%	93.9%	94.2%	94.0%	94.1%
Zn Concentrate Payable %											
Payable Zn		%	85.0%	84.7%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Concentrate Payable											
Pb Concentrate Payable											
Payable Au		oz	11,299	1,532	1,285	1,523	1,723	1,579	1,179	1,683	795
Payable Ag		oz	1,176,689	171,773	207,094	101,472	117,284	100,441	228,297	226,704	23,624
Payable Pb		tonnes	47,443	4,471	9,311	6,009	3,250	5,144	11,504	5,429	2,326
Zn Concentrate Payable											
Payable Zn		tonnes	333,888	46,937	43,590	40,221	50,952	46,200	42,375	45,271	18,342
			$ 736,089,536								
Gross Revenue											
Au Gross Revenue		US$ '000	$14,724	$1,966	$1,671	$1,988	$2,263	$2,053	$1,562	$2,187	$1,034
Ag Gross Revenue		US$ '000	$22,658	$3,143	$3,831	$1,928	$2,346	$2,009	$4,395	$4,534	$472
Pb Gross Revenue		US$ '000	$97,754	$9,167	$18,937	$12,585	$6,699	$10,546	$24,093	$11,010	$4,717
Zn Gross Revenue		US$ '000	$808,470	$119,251	$113,910	$99,044	$123,563	$112,036	$100,426	$99,803	$40,437
Total Gross Revenue		**US$ '000**	**$943,606**	**$133,527**	**$138,348**	**$115,545**	**$134,871**	**$126,644**	**$130,476**	**$117,535**	**$46,660**
Total Charges											
Transport to Port											
Pb Concentrate		US$ '000	$3,122	$334	$631	$403	$212	$328	$707	$355	$153
Zn Concentrate		US$ '000	$21,804	$3,528	$2,989	$2,663	$3,174	$2,779	$2,622	$2,857	$1,193
Treatment											
Pb Concentrate		US$ '000	$15,586	$1,254	$3,033	$2,018	$1,106	$1,786	$3,765	$1,848	$775
Zn Concentrate		US$ '000	$158,238	$18,552	$20,514	$19,470	$24,462	$22,477	$20,947	$22,533	$9,283
Refining cost											
Au		US$ '000	$169	$23	$19	$23	$26	$24	$18	$25	$12
Ag		US$ '000	$1,765	$258	$311	$152	$176	$151	$342	$340	$35
Zn Impurities		US$ '000	$3,627	$529	$471	$438	$544	$497	$459	$490	$200
Freight Roll Back											
Pb		US$ '000	$7,677	$743	$1,468	$977	$535	$864	$1,822	$894	$375
Zn		US$ '000	$49,395	$7,238	$6,402	$5,954	$7,405	$6,766	$6,249	$6,661	$2,719
Total Charges		US$ '000	$261,384	$32,458	$35,837	$32,096	$37,641	$35,672	$36,931	$36,004	$14,744
Net Smelter Return		**US$ '000**	**$682,222**	**$101,069**	**$102,511**	**$83,449**	**$97,230**	**$90,972**	**$93,545**	**$81,531**	**$31,916**
Royalty NSR	6%	US$ '000	$40,933	$6,064	$6,151	$5,007	$5,834	$5,458	$5,613	$4,892	$1,915
Net Revenue		**US$ '000**	**$641,289**	**$95,005**	**$96,360**	**$78,442**	**$91,396**	**$85,513**	**$87,932**	**$76,639**	**$30,001**
Unit NSR		**US$/t milled**	**$128**	**$149**	**$147**	**$118**	**$136**	**$128**	**$131**	**$108**	**$91**

	INPUTS	UNITS	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024
OPERATING COST											
Mining (Underground)		US$/t milled	$18.04	$19.01	$18.48	$18.16	$18.00	$18.07	$18.09	$17.05	$17.05
Processing		US$/t milled	$10.79	$11.37	$11.05	$10.86	$10.77	$10.81	$10.82	$10.20	$10.20
Maintenance		US$/t milled	$8.43	$8.88	$8.64	$8.49	$8.41	$8.44	$8.45	$7.97	$7.97
G&A		US$/t milled	$7.01	$6.62	$6.72	$6.90	$7.29	$7.32	$7.32	$6.90	$6.90
Total Operating Cost		**US$/t milled**	**$44.26**	**$45.88**	**$44.89**	**$44.42**	**$44.47**	**$44.64**	**$44.69**	**$42.12**	**$42.12**
Mining (Underground)		US$ '000	$90,320	$12,102	$12,102	$12,102	$12,102	$12,102	$12,102	$12,102	$5,603
Processing		US$ '000	$54,021	$7,239	$7,239	$7,239	$7,239	$7,239	$7,239	$7,239	$3,351
Maintenance		US$ '000	$42,208	$5,656	$5,656	$5,656	$5,656	$5,656	$5,656	$5,656	$2,619
G&A		US$ '000	$35,081	$4,213	$4,400	$4,600	$4,900	$4,900	$4,900	$4,900	$2,269
Total Operating Cost		**US$ '000**	**$221,630**	**$29,209**	**$29,396**	**$29,596**	**$29,896**	**$29,896**	**$29,896**	**$29,896**	**$13,842**
Operating Cashflow		US$ '000	$419,659	$65,796	$66,964	$48,845	$61,499	$55,617	$58,036	$46,743	$16,159
CAPITAL COST											
Stay in Business Capital											
Engineering & HSEC		US$ '000	$8,205	$1,768	$1,232	$670	$907	$907	$907	$907	$907
Exploration		US$ '000	$3,747	$942	$1,018	$967	$820	$0	$0	$0	$0
Mine development		US$ '000	$23,963	$6,656	$7,142	$7,045	$3,120	$0	$0	$0	$0
Mining equipment		US$ '000	$37,870	$2,952	$5,756	$4,119	$5,009	$5,009	$5,009	$5,009	$5,009
Plant		US$ '000	$709	$215	$80	$200	$41	$43	$43	$43	$43
Services & Maintenance		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Administration, IT		US$ '000	$1,546	$479	$277	$225	$109	$114	$114	$114	$114
Total Direct Cost		**US$ '000**	**$76,040**	**$13,012**	**$15,506**	**$13,225**	**$10,005**	**$6,073**	**$6,073**	**$6,073**	**$6,073**
Business Improvement		US$ '000	$8,379	$7,322	$1,057	$0	$0	$0	$0	$0	$0
Working Capital		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Reclamation and closure		US$ '000	$3,819	$0	$0	$0	$0	$0	$0	$0	$3,819
Total Capital Cost		**US$ '000**	**$88,239**	**$20,334**	**$16,563**	**$13,225**	**$10,005**	**$6,073**	**$6,073**	**$6,073**	**$9,892**
Net Cash Cost Including Capital		US$/Lb payable Zn	$0.63	$0.68	$0.65	$0.70	$0.61	$0.59	$0.53	$0.58	$0.83
PRE-TAX CASH FLOW											
Net Pre-Tax Cashflow		US$ '000	$331,420	$ 45,462	$ 50,400	$ 35,620	$ 51,494	$ 49,544	$ 51,963	$ 40,670	$6,267
Cumulative Pre-Tax Cashflow		US$ '000		$ 45,462	$ 95,862	$ 131,482	$ 182,976	$ 232,520	$ 284,483	$ 325,153	$331,420
Taxes		US$ '000	$95,382	$ 16,683	$ 17,121	$ 10,327	$ 15,072	$ 12,866	$ 13,773	$ 9,539	$0
After-Tax Cashflow		US$ '000	$236,038	$ 28,778	$ 33,279	$ 25,293	$ 36,422	$ 36,678	$ 38,190	$ 31,131	$6,267
Cumulative After-Tax Cashflow		US$ '000		$ 28,778	$ 62,057	$ 87,350	$ 123,772	$ 160,450	$ 198,639	$ 229,771	$236,038
PROJECT ECONOMICS											
Pre-Tax IRR		%	0.0%								
Pre-tax NPV at 5% discounting	5.0%	US$ '000	$272,886								
Pre-tax NPV at 7.5% discounting	7.5%	US$ '000	$249,343								
Pre-tax NPV at 10% discounting	10.0%	US$ '000	$228,803								
After-Tax IRR		%	0.0%								
After-Tax NPV at 5% discounting	5.0%	US$ '000	$193,008								
After-Tax NPV at 7.5% discounting	7.5%	US$ '000	$175,773								
After-tax NPV at 10% discounting	10.0%	US$ '000	$160,775								

SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined through analysis of cash flow sensitivities:

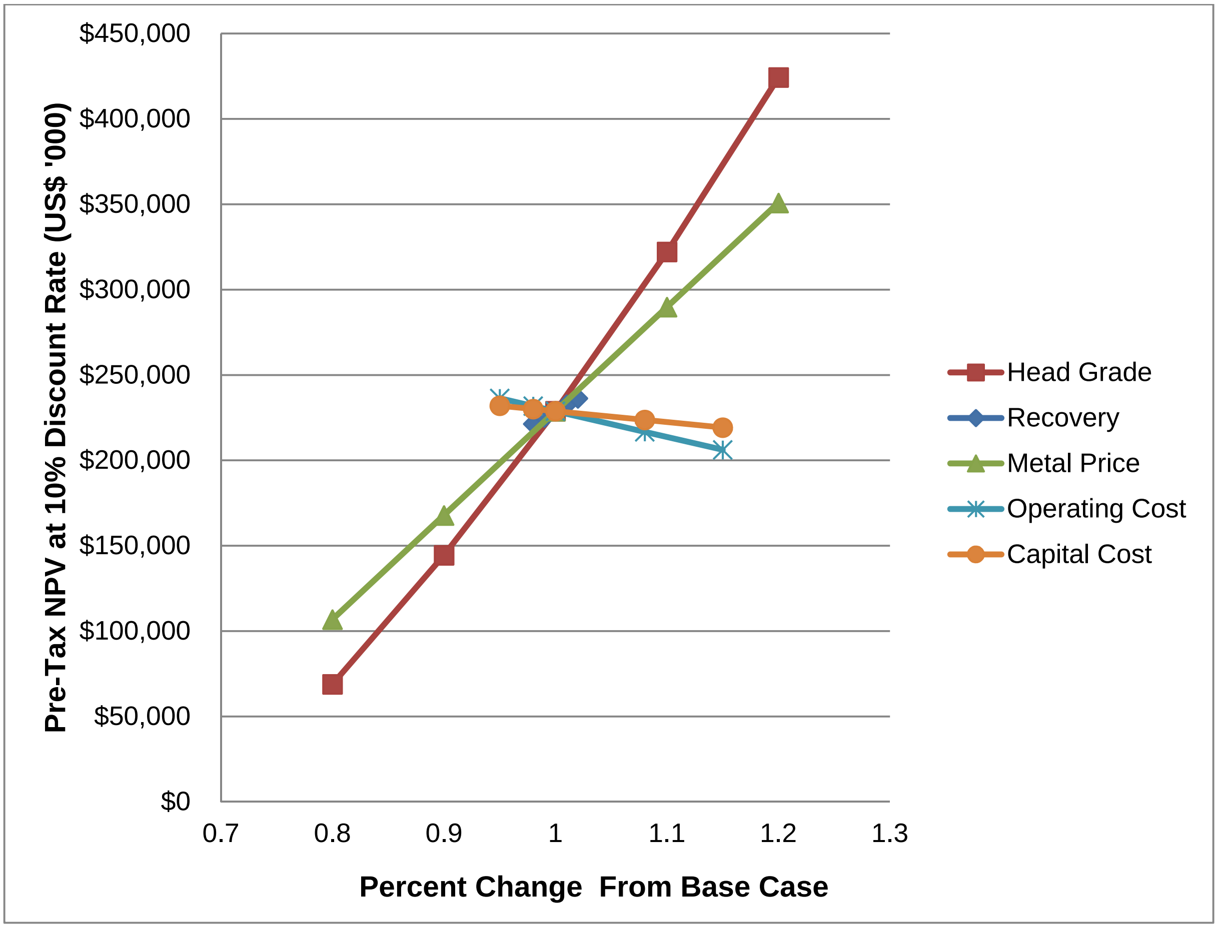
- Head grade
- Zinc recovery
- Zinc price
- Operating costs
- Sustaining capital costs

NPV at a 10% discount sensitivities over the Base Case have been calculated per Table 22-2. The sensitivities are shown in Table 22-2 and Figure 22-1. The Project return is most sensitive to the product of changes in the head grade and zinc price followed by changes in the recovery, capital costs, and operating costs.

TABLE 22-2 SENSITIVITY ANALYSIS
Trevali Mining Corporation – Rosh Pinah Mine

	Head Grade (% Zn)	NPV at 10% ($M)
0.80	5.5	68.9
0.90	7.1	144.4
1.00	**8.8**	**228.8**
1.10	10.7	322.1
1.20	12.8	424.3
	% Recovery	**NPV at 10% ($M)**
0.98	87.6	221.3
0.99	88.5	225.0
1.00	**89.4**	**228.8**
1.01	90.3	232.6
1.02	91.2	236.3
	Zinc Price ($/lb)	**NPV at 10% ($M)**
0.80	0.88	106.8
0.90	0.99	167.8
1.00	**1.10**	**228.8**
1.10	1.21	289.8
1.20	1.32	350.8
	Operating Costs ($M)	**NPV at 10% ($M)**
0.95	210.5	236.3
0.98	217.2	231.8
1.00	**221.6**	**228.8**
1.08	239.4	216.7
1.15	254.9	206.2
	Capital Costs ($M)	**NPV at 10% ($M)**
0.95	83.8	232.0
0.98	86.5	230.1
1.00	**88.2**	**228.8**
1.08	95.3	223.7
1.15	101.5	219.2

FIGURE 22-1 SENSITIVITY ANALYSIS - PRE-TAX NPV



RPA is of the opinion that the study work on the Rosh Pinah mine is suitable for the declaration of Mineral Reserves.

23 ADJACENT PROPERTIES

Vedanta's Skorpion Zinc mine is located 20 km northwest of Rosh Pinah. The Skorpion Zinc mine comprises an open-pit mine and a refinery. Established by Anglo American Corporation, Skorpion came into production in 2003, and was acquired by Vedanta in 2010.

Commissioned in early 2003, Skorpion Zinc became the first mine-to-metal operation to commercially apply a purely hydrometallurgical process route to exploit a zinc oxide orebody. Skorpion Zinc produces 150,000 tonnes of special high grades (SHG) zinc per annum, which is shipped to their world-wide markets through the southern port of Luderitz. A pit push back is currently underway to extend LOM to 2020. Skorpion Zinc is also reviewing options for a LOM extension via underground development beyond 2020 (Skorpion Zinc, 2017).

RPA has not independently verified this information and this information is not necessarily indicative of the mineralization at the RPZC.

24 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 INTERPRETATION AND CONCLUSIONS

Based on RPA's site visit, discussion with Rosh Pinah personnel, and review of the available documentation, RPA offers the following interpretation and conclusions.

GEOLOGY AND MINERAL RESOURCES

- The geology and mineralization is well understood by Rosh Pinah geology personnel.
- Drilling, sampling, QA/QC, and sample preparation and analyses were appropriate for the style of mineralization and adequate for Mineral Resource estimation.
- The assumptions, parameters, and methodology are appropriate for the style of mineralization.
- Mineral Resources were estimated consistent with CIM definitions.
- Measured plus Indicated Mineral Resources total 9.94 Mt grading 7.85% Zn, 1.51% Pb, and 24.20 g/t Ag.
- Inferred Mineral Resources total 2.93 Mt grading 5.96% Zn, 1.06% Pb, and 30.04 g/t Ag.
- The extent of the orebody and mine has been generally defined by exploration drilling, however, the potential below and lateral to current orebodies is being investigated and considered high.

MINING AND MINERAL RESERVES

- The Mineral Reserve estimate has been prepared utilizing acceptable estimation methodologies and the classification of Proven and Probable Mineral Reserves conform to CIM definitions and NI 43-101.
- The Mineral Reserve estimate was prepared using Mineable Stope Optimizer (MSO) to determine an array of potential minable stope shapes per level based on a selection of cut-off grades as determined using a Basic Mining Equation (BME) which captures the full cost of the mining operation including mining, processing, shipping, and smelting costs.
- The NSR cut-off values used for Mineral Reserve estimation are acceptable.
- The Proven and Probable Mineral Reserve totals 5.08 Mt at 8.78% Zn, 1.45% Pb, and 20.75 g/t Ag containing 446,700 t of zinc and 73,500 t of lead.
- The Mineral Reserve estimate takes into consideration metallurgical recoveries, concentrate grades, transportation costs, smelter treatment charges, and royalty in determining economic viability.

MINERAL PROCESSING

- The process plant includes crushing, screening, and grinding followed by lead/zinc flotation and filtering to produce separate lead and zinc concentrates.

- Variations in the WF3 orebody (higher iron and harder ore) have necessitated the installation of regrind circuits (the regrind project) in both the lead and zinc circuits as well as additional cleaning capacity in the lead circuit to optimize beneficiation.

- The installation of the regrind project is to ensure that the plant achieves saleable concentrate grade at all times as well as significantly reducing iron and mercury penalties in the zinc concentrate. It is currently anticipated that the project will be completed in late 2017.

- The LOM schedule includes benefits from the regrind project from 2018 onwards including:
    - Lead recovery increase of 2.5%
    - Lead concentrate grade increase of 0.5%
    - Zinc recovery increase of 0.9%
    - Zinc concentrate grade increase of 1.6%
    - Reduced zinc impurities penalty of $5.00/t of zinc concentrate

ENVIRONMENTAL, SOCIAL, COMMUNITY

- Based on the site visit conducted on January 25 to 27, 2017 at RPZC, the review of available reports and documents as well as discussions held with management, no evidence of environmental issues that could materially impact the ability to extract the mineral resources or mineral reserves at RPZC were observed. There are, however, environmental and social risks that need to be mitigated and managed.

ECONOMIC ANALYSIS

- The pre-tax NPV at a 10% discount rate is $229 million after accounting for all operating costs, capital expenditures, and royalties.

- The LOM NPV at a 10% discount rate is most sensitive to the product of changes in the head grade and zinc price followed by changes in the recovery, capital costs, and operating costs.

26 RECOMMENDATIONS

RPA offers the following recommendations.

GEOLOGY AND MINERAL RESOURCES

- Since the internal RPML is not internationally certified, RPA recommends that a consistent review of external check assaying for geology samples be implemented.

- A reconciliation of the resource model versus the actual tonnage and grade, as determined by the process facility, should be a standard practice for the annual Mineral Resource estimation.

- A standard Mineral Resource reporting template should be updated each year for all reported Mineral Resources.

MINING AND MINERAL RESERVES

- Continue to install cable anchor ground support in areas with stability issues in the WF3 orebody.

- Carry out improvements in the underground water handling system.

MINERAL PROCESSING

- Implement the regrind project to maintain historical throughput levels and recoveries.

ENVIRONMENTAL, SOCIAL, COMMUNITY

- The following environmental and social risks need to be mitigated and managed:
    - The PM10 dust fallout levels at the mine at village of Rosh Pinah.
    - Continue monitoring lead in blood levels and take appropriate control measures to keep lead levels below regulatory parameters (especially in areas that are affected by the tailing facility and in the storage area in Lüderitz).
    - Surface and ground water quality samples should be handled and analyzed in line with Laboratory Testing Standards to ensure data is adequate to understand potential pollution plumes developing around the operational facilities at the mine. Check samples at outside laboratories should be sent to help verify lab results on site.
    - Acid rock drainage potential should be evaluated and managed.
    - Social expectations of employees and residents of Rosh Pinah, should Skorpion Zinc cease mining operations.
    - RoshSkor, a joint-venture private company established to manage and operate the town of Rosh Pinah as a private municipality, will need to be managed in closing out of the audit findings regarding waste management.
    - Plans to be developed around water and power security.

27 REFERENCES

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28 DATE AND SIGNATURE PAGE

This report titled "Technical Report on the Rosh Pinah Mine, Namibia" and dated April 7, 2017 was prepared and signed by the following authors:

(Signed and Sealed) "*Torben Jensen*"

Dated at Toronto, ON
April 7, 2017

Torben Jensen, P.Eng.
Principal Mining Engineer

(Signed and Sealed) "*Ian T. Blakley*"

Dated at London, UK
April 7, 2017

Ian T. Blakley., P.Geo.
Principal Geologist

(Signed and Sealed) "*Tracey Jacquemin*"

Dated at Johannesburg, SA
April 7, 2017

Tracey Jacquemin, Pr.Sci.Nat.
Position Manager Environment and Society
Mining, Sub-Saharan Africa
Advisian

(Signed and Sealed) "*Holger Krutzelmann*"

Dated at Toronto, ON
April 7, 2017

Holger Krutzelmann, P.Eng.
Associate Principal Metallurgist

29 CERTIFICATE OF QUALIFIED PERSON

TORBEN JENSEN

I, Torben Jensen, P.Eng., as an author of this report entitled “Technical Report on the Rosh Pinah Mine, Namibia” prepared for Trevali Mining Corporation and dated April 7, 2017, do hereby certify that:

1. I am a Principal Mining Engineer with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of South Dakota School of Mines and Technology in 1978 with a B.Sc. degree in Mining Engineering.

3. I am registered as a Professional Engineer in the Province of Ontario (Reg.#9028688). I have worked as a mining engineer for a total of 36 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Preparation of NI 43-101 Technical Reports, feasibility studies, and due diligence reviews for a wide range of commodities including gold, silver, nickel, lead, zinc, uranium, coal, asbestos, potash, copper, and diamonds.
   - Vice President Corporate Development with a Canadian gold mining company, responsible for the evaluation of investment opportunities.
   - Vice President Engineering with a Canadian base metal mining company, responsible for preparation of feasibility studies related to property acquisitions and development, engineering design of underground and open pit projects, short and long range mine planning, capital and operating cost estimation for budgets, and permitting.
   - Manager of Engineering with a Canadian based mining company, responsible for the reopening of a former nickel mine.
   - Chief Mining Engineer with a Canadian-based coal company, responsible for mine contracting, short and long range mine planning, budget preparations, scheduling, project management, feasibility studies related to property acquisitions, open pit and underground engineering design, underground construction design, costing, and supervision.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Rosh Pinah mine from January 25 to 27, 2017.

6. I am responsible for Sections 15, 16, 18, 19, 21, and 22 and share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report Sections 15, 16, 18, 19, 21, and 22 for which I am responsible and Sections 1, 24, 25, 26, and 27 for which I share responsibility contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 7th day of April, 2017

(Signed and Sealed) "*Torben Jensen*"

Torben Jensen, P.Eng.

IAN T. BLAKLEY

I, Ian T. Blakley, P.Geo., as an author of this report entitled "Technical Report on the Rosh Pinah Mine, Namibia" prepared for Trevali Mining Corporation and dated April 7, 2017, do hereby certify that:

1. I am a Principal Geologist and Vice-President and General Manager of RPA UK Ltd. of One Fetter Lane, Suite 311, London, UK EC4A 1BR.

2. I am a graduate of the University of Waterloo, Waterloo, Ontario, Canada, in 1984 with a Bachelor of Science degree in Honours Co-operative Applied Earth Sciences/Geology Option.

3. I am registered as a Professional Geoscientist in the Province of Ontario (Reg. #1446). I have worked as a Geologist for a total of 34 years since my graduation. My relevant experience for the purpose of the Technical Report is:
    - Review and reporting, including Mineral Resource estimation, as a geological consultant on numerous exploration and mining projects around the world for due diligence and regulatory requirements.
    - Vice-President – Exploration with a Canadian private company exploring and developing world-class gold assets in northeastern Kazakhstan.
    - Chief Geologist with a major Canadian mining company responsible for the management of geological exploration, resource definition and production.
    - Senior Mines Exploration Geologist for new capital underground mining projects including exploration and definition drilling, resource definition, infrastructure positioning, production and reconciliation.
    - Exploration Geologist responsible for sampling and mapping programs at gold and base metal properties in Canada.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Rosh Pinah mine from January 25 to 27, 2017.

6. I am responsible for Sections 2 to 12, 14, and 23 and share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Technical Report Sections 2 to 12, 14, and 23 for which I am responsible and Sections 1, 24, 25, 26, and 27 for which I share responsibility contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 7th day of April, 2017

(Signed and Sealed) "*Ian T. Blakley*"

Ian T. Blakley, P. Geo.

TRACEY JACQUEMIN

I, Tracey Jacquemin, Pr.Sci.Nat 400163/12, as an author of item 20 of this report entitled "Technical Report on the Rosh Pinah Mine, Namibia" prepared for Trevali Mining Corporation and dated April 7, 2017, do hereby certify that:

1. I am Position Manager Environment and Society Mining, Sub-Saharan Africa with Advisian (Trading as WorleyParsons RSA) at 39 Melrose Boulevard, Melrose Arch, Johannesburg, South Africa.

2. I am a graduate of University of the Witwatersrand, Johannesburg, South Africa in 2004 with a Bachelor of Science Degree with Honours (BSc Hons.) Ecology, Environment and Conservation Biology.

3. I am registered as a Professional Environmental Scientist in the Country of Republic of South Africa (Pr.Sci.Nat 400163/12). I have worked as an Environmental Scientist for a total of 12 years since my graduation. My relevant experience for the purpose of the Technical Report is:
    - Four years of consulting experience in Sub-Sahara Africa including but not limited to Environmental project management, contract management, due diligences, Environmental Impact Assessments, Basic Assessments, Water Use Licence Applications and Waste Licence Applications Permitting in terms of the South African Legislative Framework, Environmental Compliance Assessments and Auditing, Environmental Management System Development and Implementation and Environmental Control Officer work.
    - Environmental Manager for an Underground Mining Project
    - Environmental Project Manager / Environmental Assessment Practitioner for a South African Mine.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Rosh Pinah mine from January 25 to 27, 2017.

6. I am responsible for the preparation of Environmental Studies, Permitting and Social or Community Impact as described in Section 20 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report Section 20 contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 7th day of April, 2017

(Signed and Sealed) "*Tracey Jacquemin*"

Tracey Jacquemin, Pr.Sci.Nat 400163/12

HOLGER KRUTZELMANN

I, Holger Krutzelmann, P.Eng., as an author of this report entitled “Technical Report on the Rosh Pinah Mine, Namibia” prepared for Trevali Mining Corporation and dated April 7, 2017, do hereby certify that:

1. I am an Associate Principal Metallurgist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of Queen’s University, Kingston, Ontario, Canada in 1978 with a B.Sc. degree in Mining Engineering (Mineral Processing).

3. I am registered as a Professional Engineer with Professional Engineers Ontario (Reg. #90455304). I have worked in the mineral processing field, in operating, metallurgical, managerial; and engineering functions, for a total of 36 years since my graduation. My relevant experience for the purpose of the Technical Report is:
    - Reviews and reports as a metallurgical consultant on a number of mining operations and projects for due diligence and financial monitoring requirements
    - Senior Metallurgist/Project Manager on numerous gold and base metal studies for a leading Canadian engineering company.
    - Management and operational experience at several Canadian and U.S. milling operations treating various metals, including copper, zinc, gold and silver.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit Rosh Pinah mine.

6. I am responsible for Sections 13 and 17 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Technical Report Sections 13 and 17 for which I am responsible and Sections 1, 24, 25, 26, and 27 for which I share responsibility contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 7th day of April, 2017

(Signed and Sealed) "*Holger Krutzelmann*"

Holger Krutzelmann, P.Eng.